E-Business Strategy

”Internet Payment & Banking, Security Issues in EC”

MBA/USQ

Lecture 3

(August 24, 2000)

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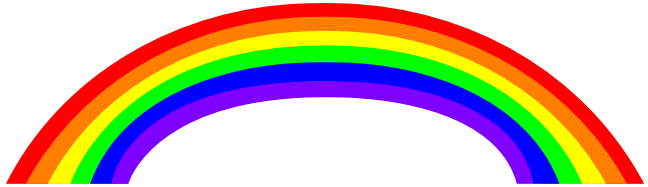
University of Leeds

Outline



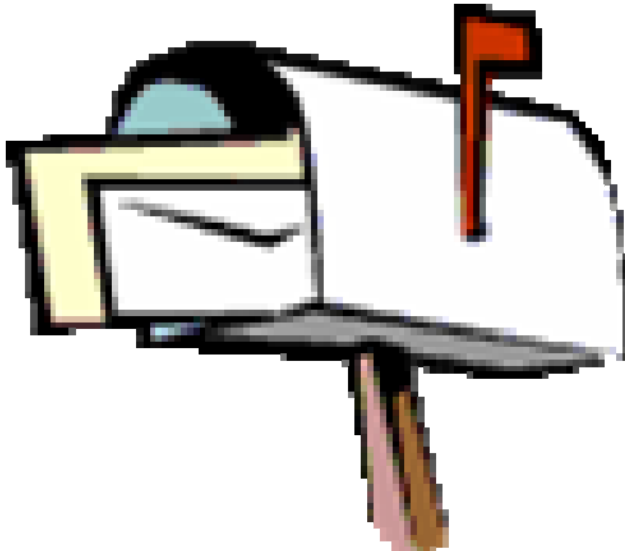
- ✓ Quick Review on Lecture 2
- ✓ Email Feedback
- ✓ Pre-M6: Cryptography 101
  - Introduction
  - Encryption: What and Why
  - Four Enablements of Cryptography
  - Private/Secret Key Cryptography
  - Public Key Cryptography
- ✓ M6: Internet Payment & Banking
  - Internet Payment Systems
  - 1. Credit Card-based System
  - 2. Digital Cash System
  - 3. Digital Cheque System
  - 4. Smart Card System
- ✓ M6: Internet Payment & Banking (cont)
  - History & Functions
  - Transaction Costs
  - 4 Phases – Services & Benefits
  - Disadvantages
- ✓ M7: Security Issues in Electronic Commerce
- ✓ Class Activity 1: Assignment 2 Discussion
- ✓ Class Activity 2: Reading
- ✓ Class Activity 3: Case Studies – 3x
- ✓ Additional Handouts for L3
- ✓ What's in Store for Lecture 4

Quick Review on Lecture 2

- ✓ M4: Strategies for Database Marketing
  - o Introduction to Direct Marketing
  - o Direct Marketing: Traditional Means vs Multi-media
  - o Introduction to Database Marketing
  - o Database Marketing: Benefits & Usage
  - o Business Intelligence & Data Mining*
  - o Data & Text Mining Applications*
  - o Business Intelligence Video* (from IBM)
- ✓ M5: Business-to-Business
  - o Introduction (revisit)
  - o Module Scope (limited)
  - o Simplified e-Business Process Model
- ✓ M5: Business-to-Business (cont)
  - o Supply Chain Management
  - o Traditional vs e-Business Supply Chain
  - o Enterprise Resource Planning*
  - o Customer Relationship Management*
  - o Electronic Data Interchange
  - o EDI: Costs and Benefits
  - o Internet EDI*
  - o From EDI to the Internet*
- ✓ Class Activity 1: Assignment 1 Discussion
- ✓ Class Activity 2: Reading
- ✓ Class Activity 3: Case Studies – 4x

Email Feedback

- Email discussions / feedback from 10 Jul - 24 Aug 2000



Pre-M6: Cryptography 101
Introduction

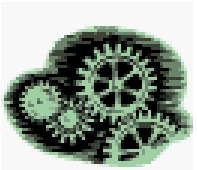
- Cryptography is the science of **information security**.
- Cryptography includes techniques such as microdots, merging words with images, text in audio, and other ways to **hide information in storage** or **transit**.
- However, in today's computer-centric world, cryptography is most often associated with **scrambling plaintext** (ordinary text) into ciphertext (a process called **encryption**), then back again (known as **decryption**).

Pre-M6: Cryptography 101

Encryption: What and Why

- What is Encryption?
  - Conversion of a message into an intermediate form in which information is **present but hidden**.
  - Encryption enables a sender to transmit a private message to a recipient **free of the risk** of the message being read by **unintended parties**.
- Why Encryption?
  - The Internet is a **public network**.
  - It's very much like sending the data on a post card. Anyone with access to the packet (post card) can read the contents (and potentially alter it).

Pre-M6: Cryptography 101
Four Enablements of Cryptography

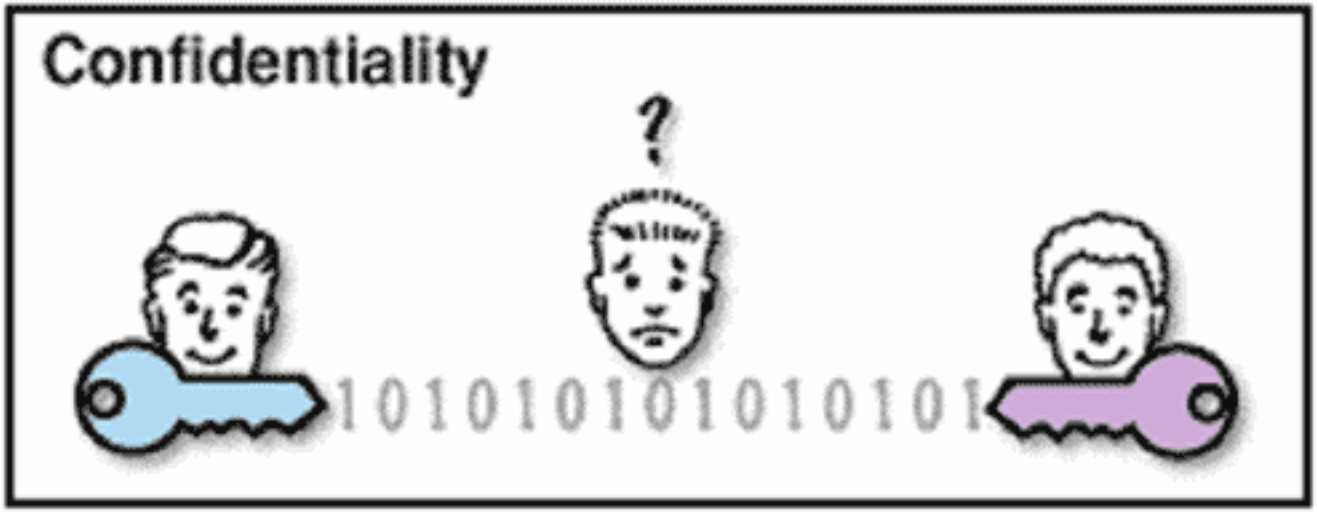


- 1) **Confidentiality**: The information **cannot be understood** by anyone for whom it was **unintended**.
- 2) **Integrity**: The information **cannot be altered** in storage or transit between sender and intended receiver **without the alteration being detected**.
- 3) **Non-repudiation**: The creator/sender of the information **cannot deny** at a later stage his or her intentions in the creation or transmission of the information.
- 4) **Authentication**: The sender and receiver can **confirm each other's identity** and the **origin/destination** of the information.

Pre-M6: Cryptography 101

Four Enablements of Cryptography: Confidentiality

- **Confidentiality**: **Preventing unauthorized** eyes from seeing information. If a CEO, for example, wanted to send a confidential e-mail message, she could encrypt that message so that only company officers possessing secret keys could decode it. Anyone else intercepting the message would see only gibberish.



Pre-M6: Cryptography 101

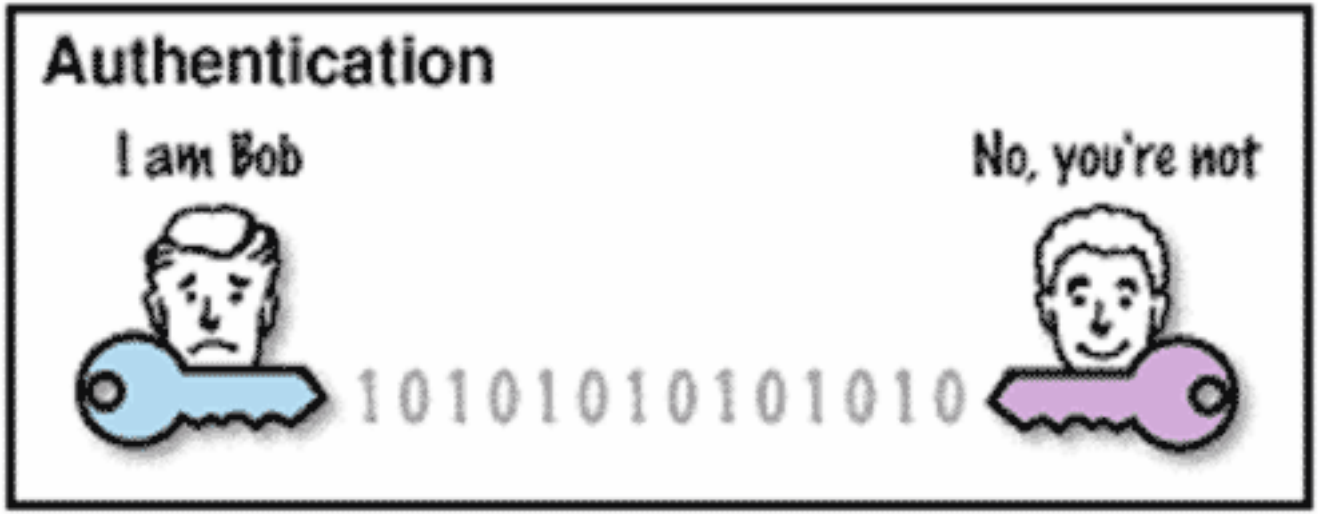
Four Enablements of Cryptography: Integrity

- **Integrity**: Guaranteeing that **information** is **not changed** during transit, i.e., that it arrives in the same form in which it left.

Pre-M6: Cryptography 101

Four Enablements of Cryptography: Authentication

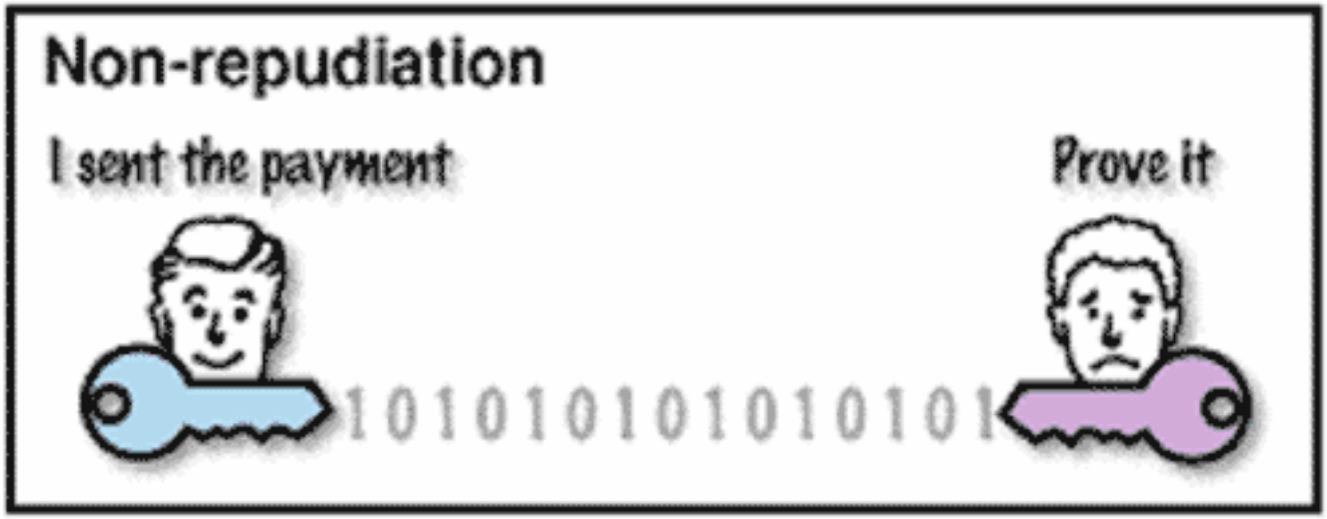
- **Authentication: Verification** of the identity of a user and the user's eligibility to access and use information.



Pre-M6: Cryptography 101

Four Enablements of Cryptography: Non-repudiation

- **Non-repudiation**: **Proof** with authority of the origin, delivery, submission or transmission of information. Cryptography can be used to provide undeniable proof that, say, a certain customer actually placed an order several weeks back.



Pre-M6: Cryptography 101
Private/Secret Key Cryptography

- **Key** (or single password) **known only** to the party or parties that exchange secret messages.
- **Examples** of private key software – Winzip, PKZip

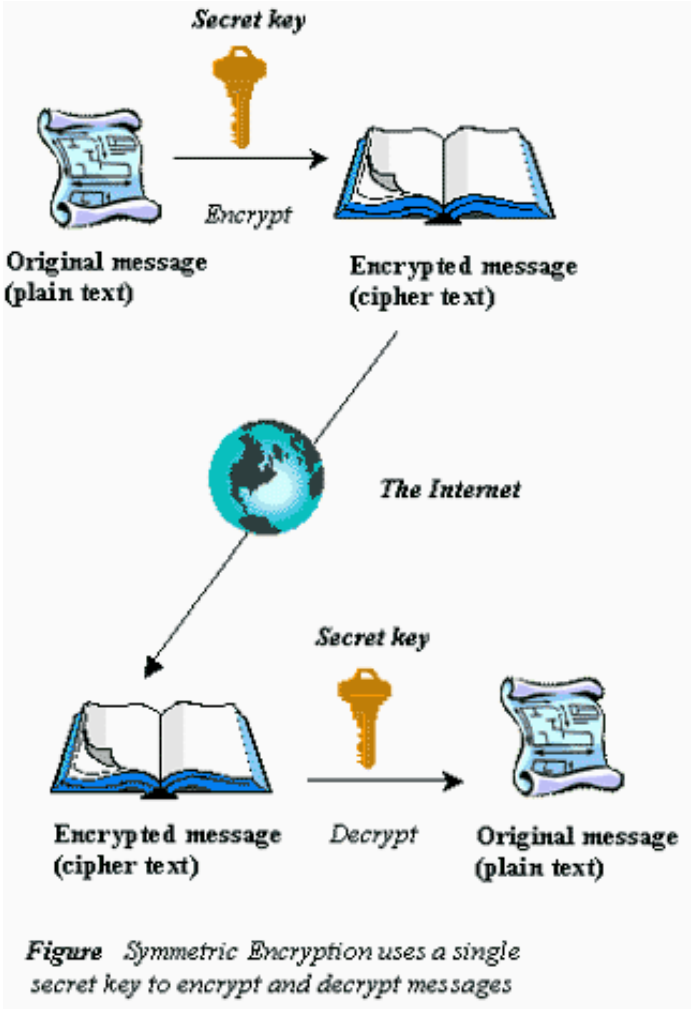


Figure Symmetric Encryption uses a single secret key to encrypt and decrypt messages

Pre-M6: Cryptography 101
Public Key Cryptography

- A public key is a value provided by some designated authority as a key that, **combined** with a **private key** derived from the **public key**, can be used to effectively encryption messages and digital signature.
- A system for using public keys is called a **public key infrastructure** (PKI).
- An example of a public key cryptography software – PGP.

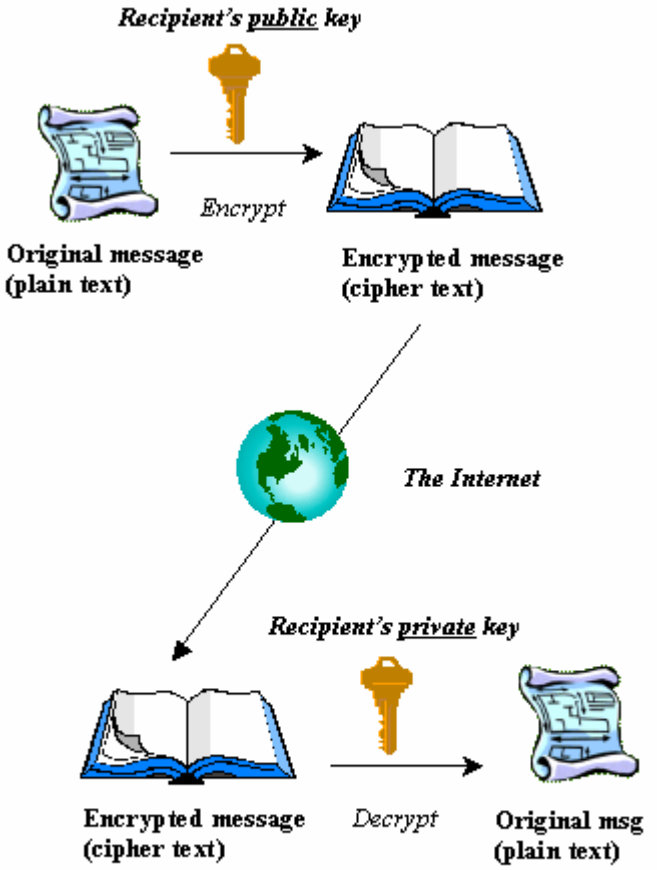


Figure *Using a pair of keys to encrypt and decrypt a message*

Pre-M6: Cryptography 101

Public Key Cryptography: Digital Signature

- A **digital signature** is an **electronic** rather than a written **signature** that can be used by someone to **authenticate** the identity of the sender of a message or of the signer of a document.
- It can also be **used to ensure** that the **original content** of the message or document that has been conveyed is **unchanged**.
- Actual process is much more complex involving message digest (not shown here).

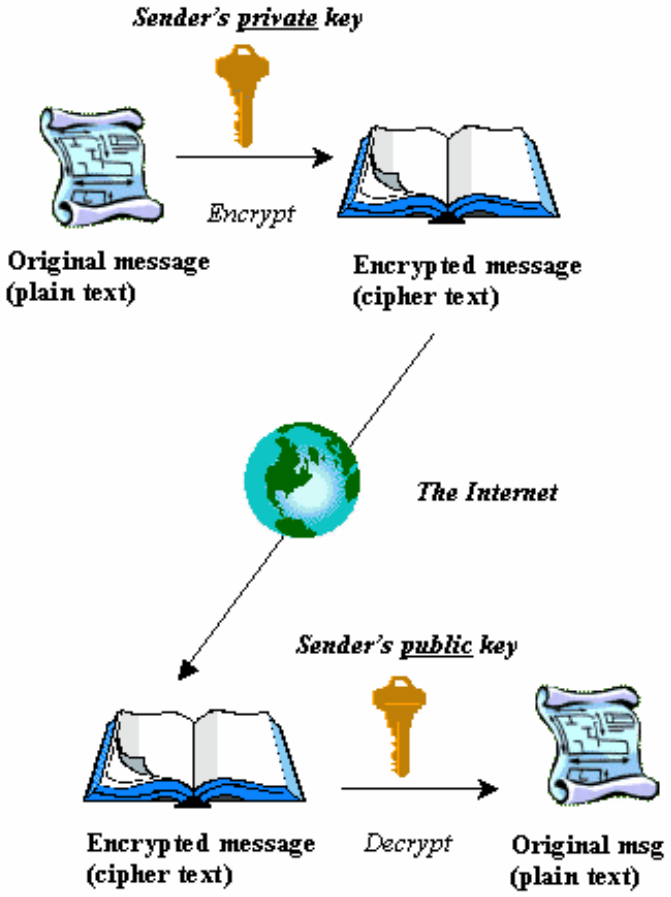
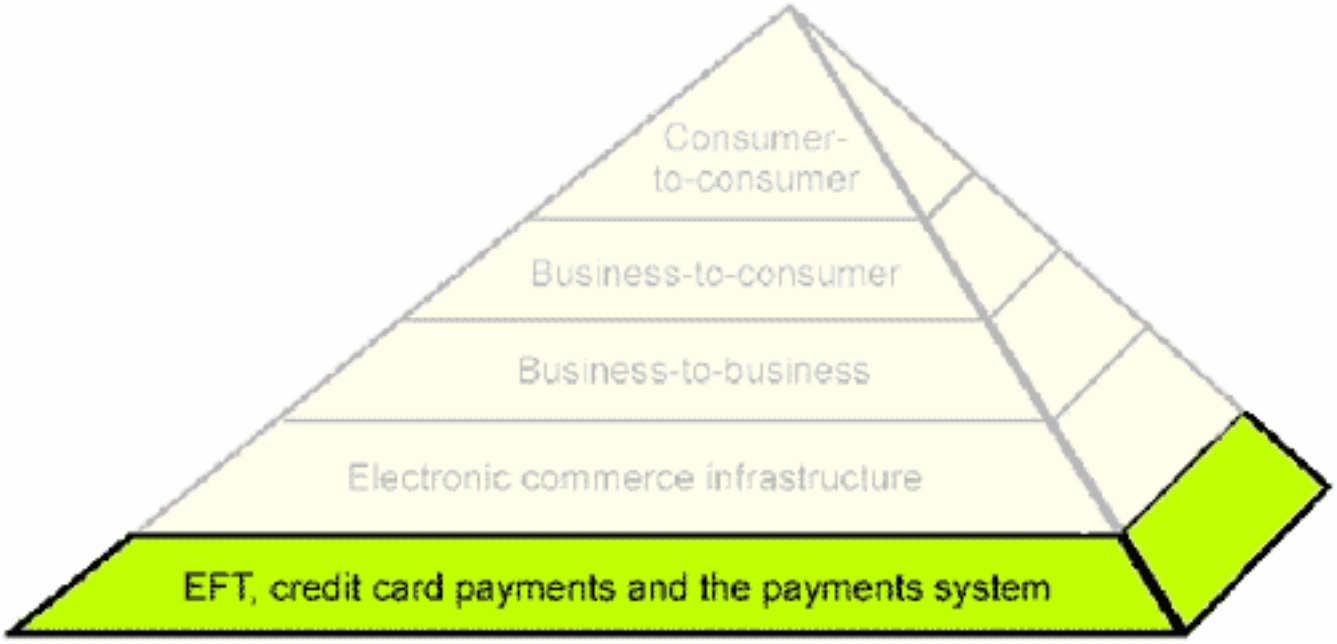


Figure *Using a 'opposite' pair of keys to encrypt and decrypt a message*

M6: Internet Payment & Banking

Internet Payment Systems

- **Electronic payment** is the **foundation** of systems for electronic commerce.



OECD 1997b, *Measuring E-commerce*, Committee for Information, Computer and Communications Policy, Paris, OCDE/GD(97)185, p. 19.

M6: Internet Payment & Banking

Internet Payment Systems (cont)

- Broadly speaking, electronic payment is a **financial exchange** that takes place **online** between **buyer** and **sellers**.
- The content of this exchange is usually some form of **digital financial instrument** (eg. credit cards, digital cash, or electronic cheques) that is backed by a bank or an intermediary.
- Four payment systems within the syllabus:
  - Credit Card-based System
  - Digital Cash System
  - Electronic Cheque System
  - Smart Card System

M6: Internet Payment & Banking
1. Credit Card-based System

- The Players
  - Cardholder
  - Merchant (seller)
  - Issuer (your bank)
  - Acquirer (merchant's financial institution, acquires the sales slips)
  - Brand (VISA, Master Card)

M6: Internet Payment & Banking

1. Credit Card-based System: Offline Usage Process

A **cardholder** requests the issuance of a card brand (like Visa and MasterCard) to an issuer bank in which the cardholder may have an account.

The authorization of card issuance by the **issuer bank**, or its designated brand company, may require customer's physical visit to an office.

A plastic card is physically delivered to the **customer's address** by mail.

The card can be in effect as the **cardholder** calls the bank for initiation and signs on the back of the card.

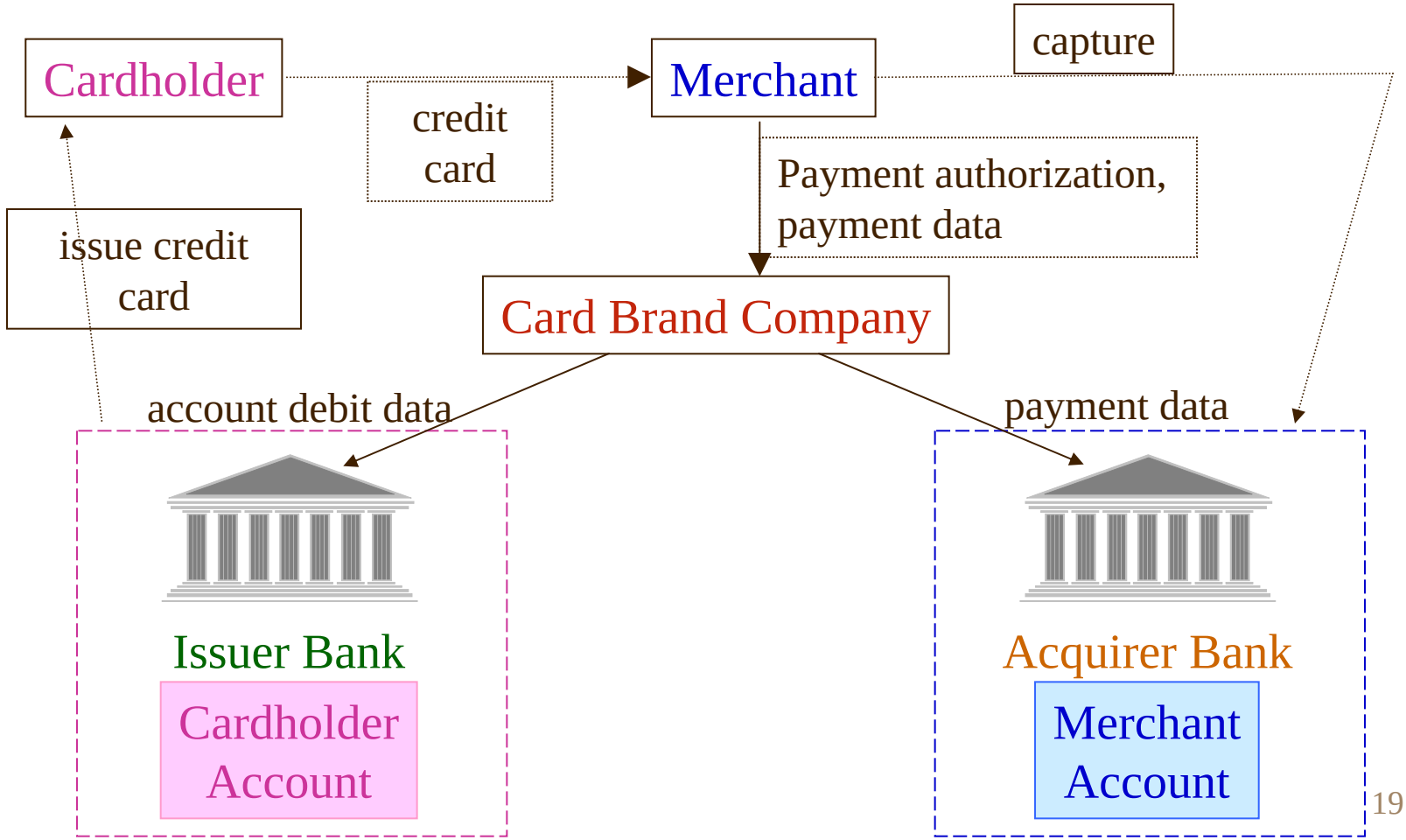
The **cardholder** shows the card to a merchant to pay a requested amount. Then the merchant asks for approval from the brand company.

Upon the approval, the **merchant** requests payment to the merchant's acquirer bank, and pays fee for the service. This process is called a "capturing process"

The **acquirer bank** requests the issuer bank to pay for the credit amount.

M6: Internet Payment & Banking

1. Credit Card-based System: Offline & Online Procedure



M6: Internet Payment & Banking
STT, SEPP, SET

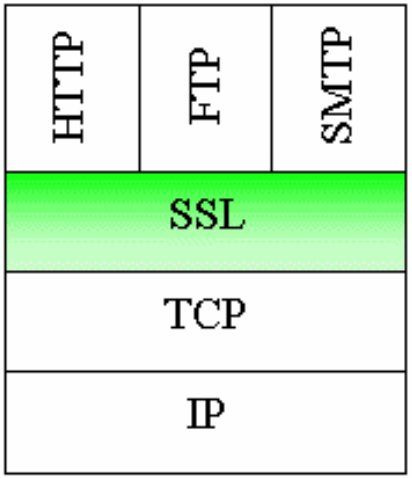
- Originally two major protocols were developed..
- **SEPP**: Mastercard, IBM and Netscape joined to develop the Secure Electronic Payment Protocol (SEPP). **STT**: Visa and Microsoft worked together to establish the Secure Transaction Technology (STT). In early 1996, these two groups agreed to establish a single payment system which became SET.
- In other words, SET is the superset of the earlier proposed payment systems STT and SEPP.
- **SET** (Secure Electronic Transaction) protocol is an Internet standard designed to provide a high level of security and anti-fraud assurances for payment card transations over the Internet.
- SET makes use of Netscape's Secure Sockets Layer (SSL (Secure Sockets Layer)), Microsoft's Secure Transaction Technology (STT), and Terisa System's Secure Hypertext Transfer Protocol (S-HTTP).

M6: Internet Payment & Banking
SSL, HTTPS, S-HTTP

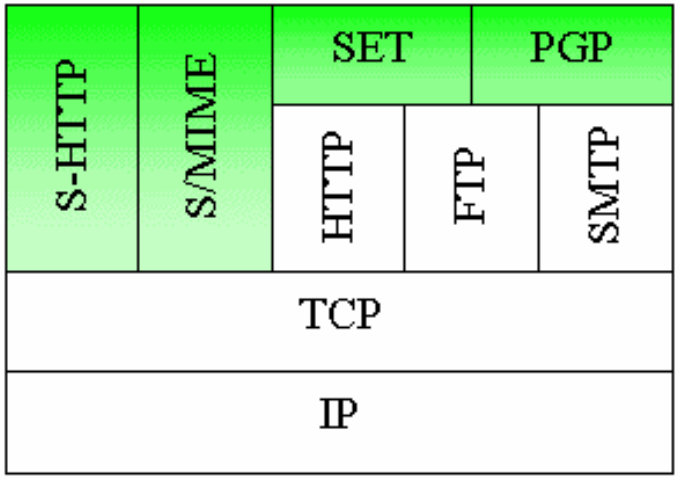
- Secure Sockets Layer, a protocol developed by Netscape for **transmitting private documents via the Internet**. SSL works by using a **private key** to encrypt data that's transferred over the SSL connection.
- Both Internet Explorer and Netscape Navigator/Comm () support SSL, and many Web sites use the protocol to obtain confidential user information, such as credit card numbers. By convention, Web pages that require an SSL connection start with https instead of http
https://vs01.tvsecure.com/~vs01000/manual/manual3.html
- S-HTTP is an **extension to the HTTP** protocol to support **sending data securely** over the World Wide Web.
- S-HTTP was developed by Enterprise Integration Technologies (EIT), which was acquired by Verifone, Inc. in 1995.
- **S-HTTP secures data**, while **SSL secures the communications channel.**

M6: Internet Payment & Banking

Security with SSL vs S-HTTP/S-MIME/SET/PGP



Security with SSL



Security with S-HTTP,S/MIME,SET,PGP

M6: Internet Payment & Banking

2. Digital Cash System

- ✓ A system that allows a person to pay for goods or services by transmitting a **number** from one computer to another.
- ✓ Like the serial numbers on real dollar bills, the **digital cash numbers are unique**. Each one is **issued by a bank** and represents a specified sum of **real money**.
- ✓ One of the key features of digital cash is that, like real cash, it is **anonymous** and **reusable**. That is, when a digital cash amount is sent from a buyer to a vendor, there is **no way to obtain information about the buyer**. This is one of the key differences between digital cash and credit card systems.

M6: Internet Payment & Banking
2. Digital Cash System: eCash Demo

- ✓ The **demonstration** shows what shopping experience will be like when pay with eCash currency.

  1. Will first see a Web page for the demo merchant Planet Coffee. This page looks like a typical online Web store.

  2. Click one of the Buy Me Now buttons to see how easy it is to buy coffee or a French press using eCash.

  3. Will then see a payment screen that shows the product selected, the total cost, and a variety of payment options.

  4. Select the payment option, and then click the Submit Payment button.

  5. Will be asked if agree to the payment. After clicking Yes, will receive the order confirmation.

http://www.ecashtechnologies.com/Consumers/ConsDemo.asp

M6: Internet Payment & Banking

2. Digital Cash System: eCash Demo (cont)

1. Will first see a Web page for the demo merchant Planet Coffee. This page looks like a typical online Web store.
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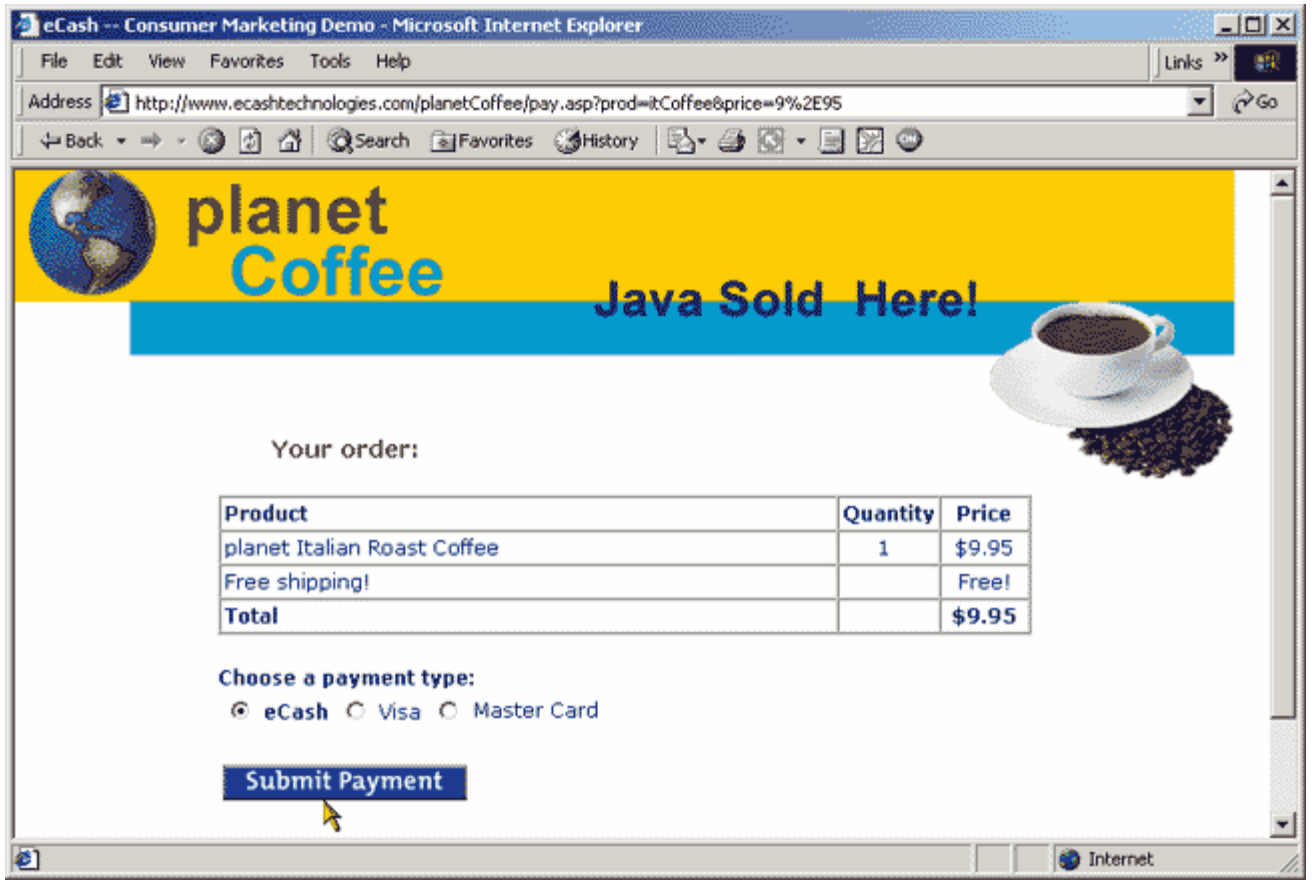
M6: Internet Payment & Banking

2. Digital Cash System: eCash Demo (cont)



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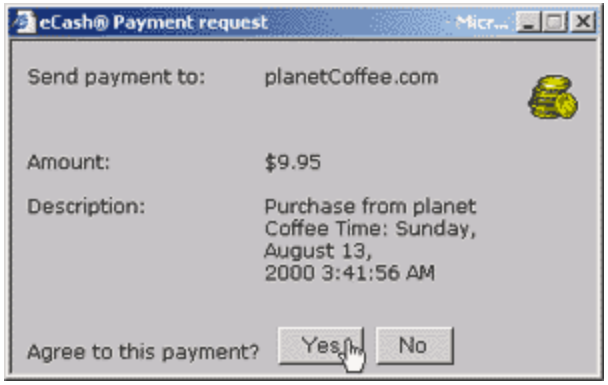
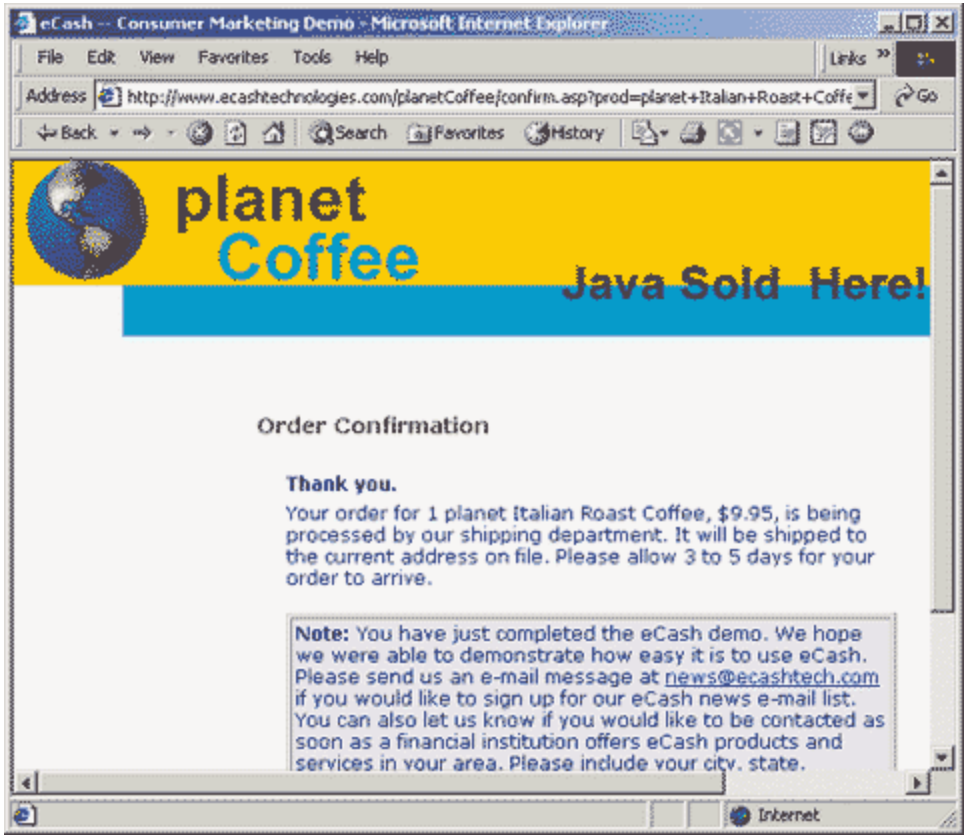
M6: Internet Payment & Banking

2. Digital Cash System: eCash Demo (cont)

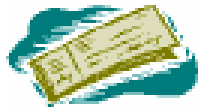




5. Will be asked if agree to the payment. After clicking Yes, will receive the order confirmation.

M6: Internet Payment & Banking

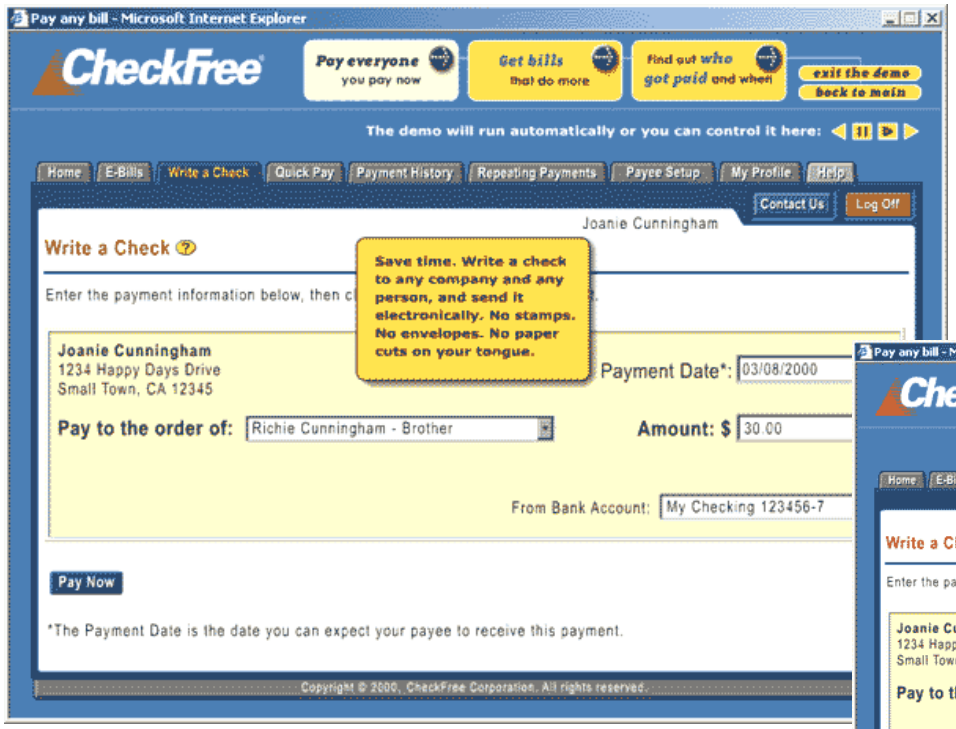
3. Digital Cheque System



- ✓ A **digital check** has many of the same features as a paper check. It functions as a message to the sender's bank to transfer funds, is given to a receive, and the receiver presents it to the bank to obtain funds.
- ✓ However, with electronic checks, **senders can protect against fraud by encoding their account number with** the **bank's public encryption key**, so the number is not revealed to the merchant.
- ✓ **Digital certificates** (DC) can be used to authenticate the payer, bank, and bank account. DC is an **attachment to an electronic message** used for **security purposes**. The most common use of a digital certificate is to **verify that a user sending a message is who he or she claims to be**, and to provide the receiver with the means to encode a reply.
- ✓ CheckFree Demo: http://www.checkfree.com/

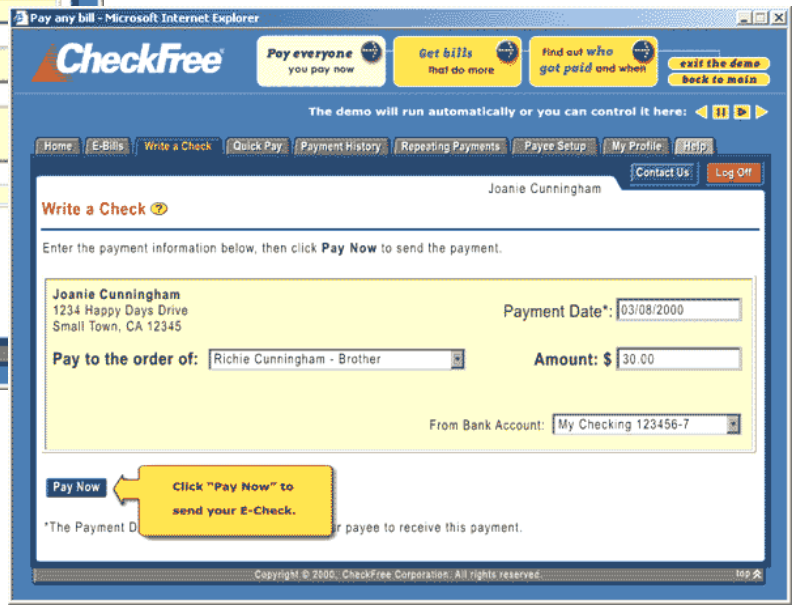
M6: Internet Payment & Banking

3. Digital Cheque System: Checkfree Demo



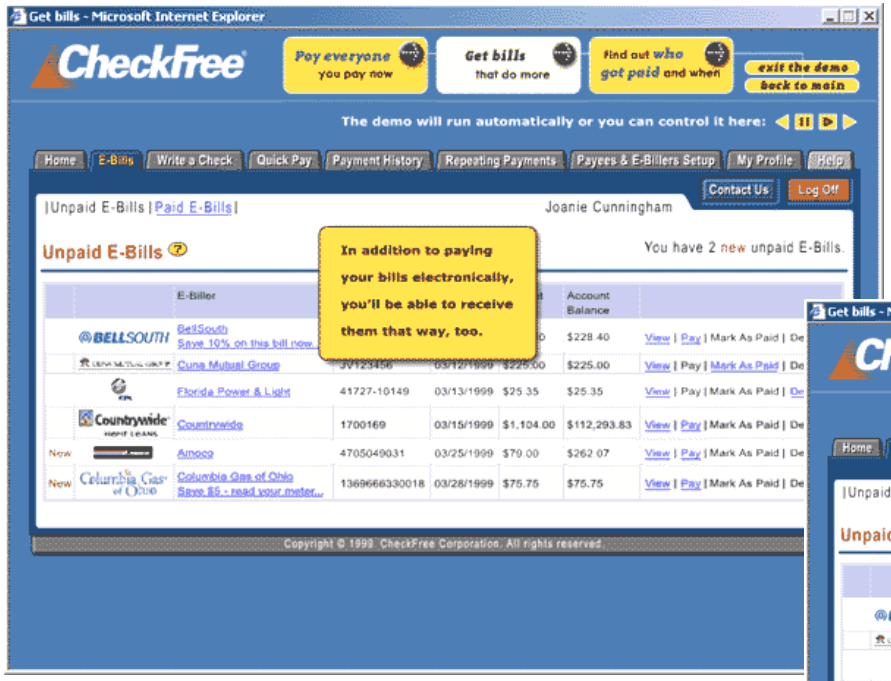
1/6: Writing a Digital Check

2/6: Click to “Pay Now”



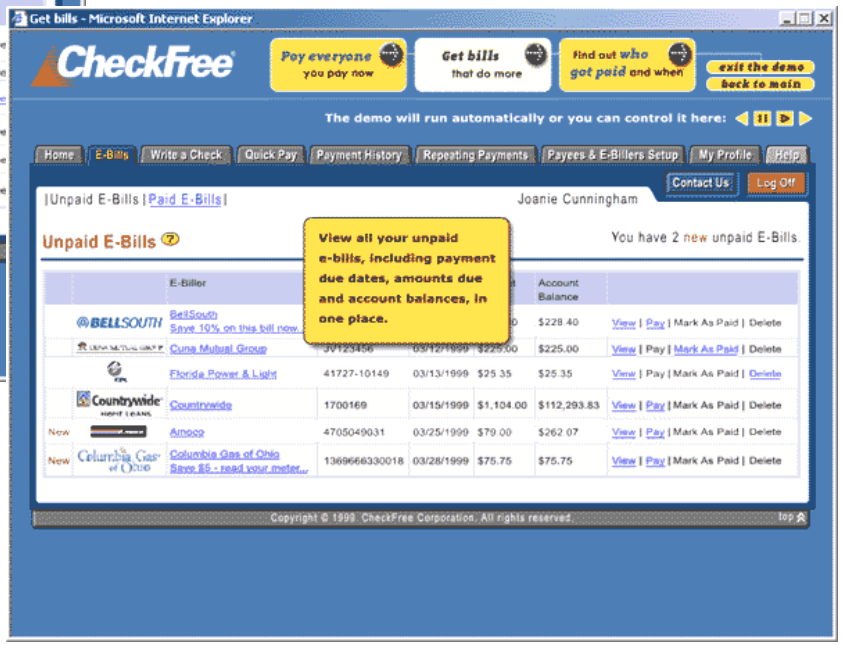
M6: Internet Payment & Banking

3. Digital Cheque System: Checkfree Demo (cont)



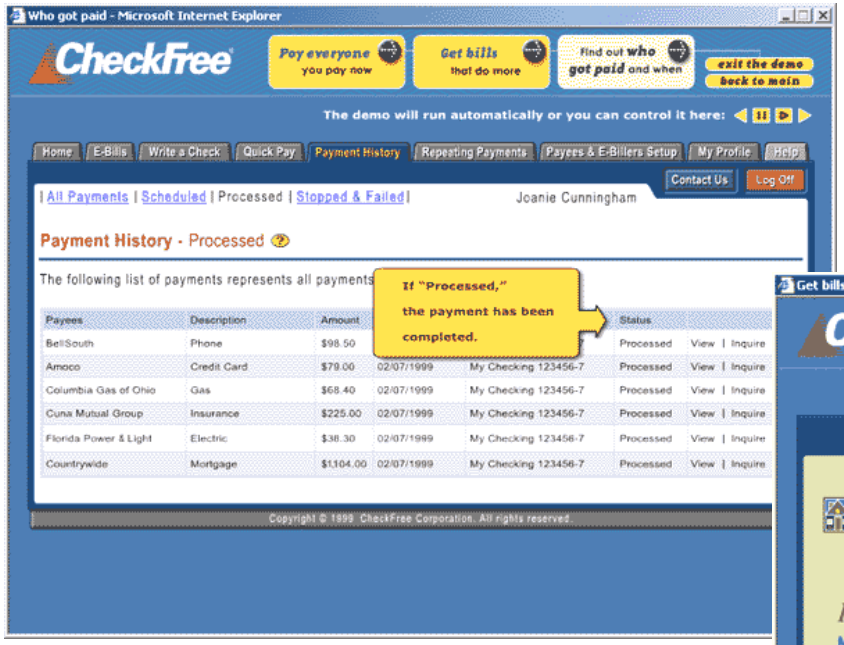
3/6: List of Bills

4/6: List of Bills



M6: Internet Payment & Banking

3. Digital Cheque System: Checkfree Demo (cont)

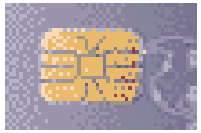


5/6: Status of Payment

6/6: Electronic view of actual bill

M6: Internet Payment & Banking

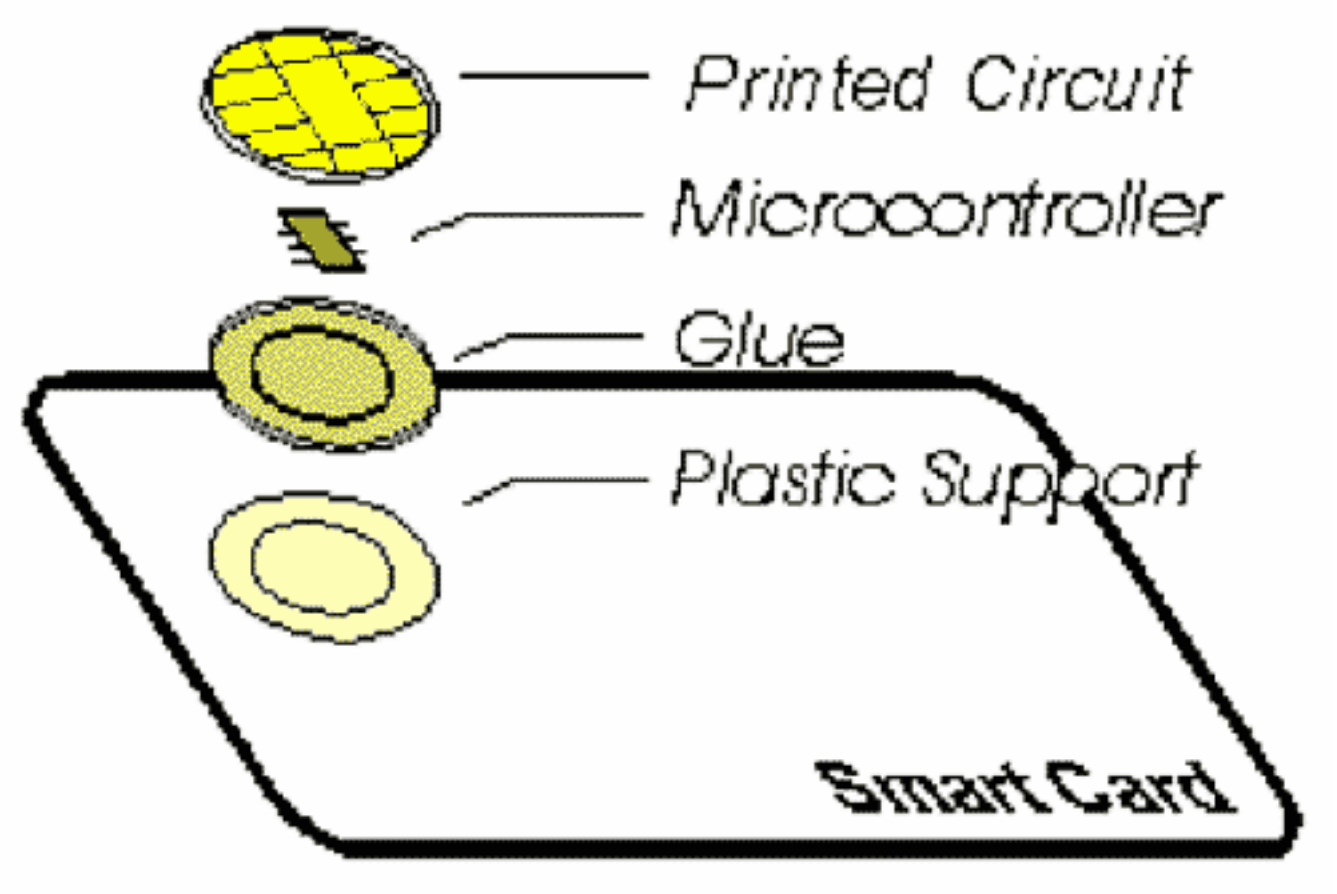
4. Smart Card System



- ✓ A **smart card** is a credit card-sized device that has an embedded **microprocessor**, a **small amount of memory**, and an **interface** that allows it to communicate with a workstation or network.
- ✓ Smart Cards provide **several capabilities**:
  - ✓ **Portable Storage –** card carried by owner and therefore can be used anywhere and the owner is not confined to a single computer.
  - ✓ **Secure Storage –** passwords, money value etc. can be stored without being easily tampered with.
  - ✓ **Trusted Execution Environment –** smart cards are not vulnerable to viruses and intrusion risks, and can therefore be given a greater degree of trust.

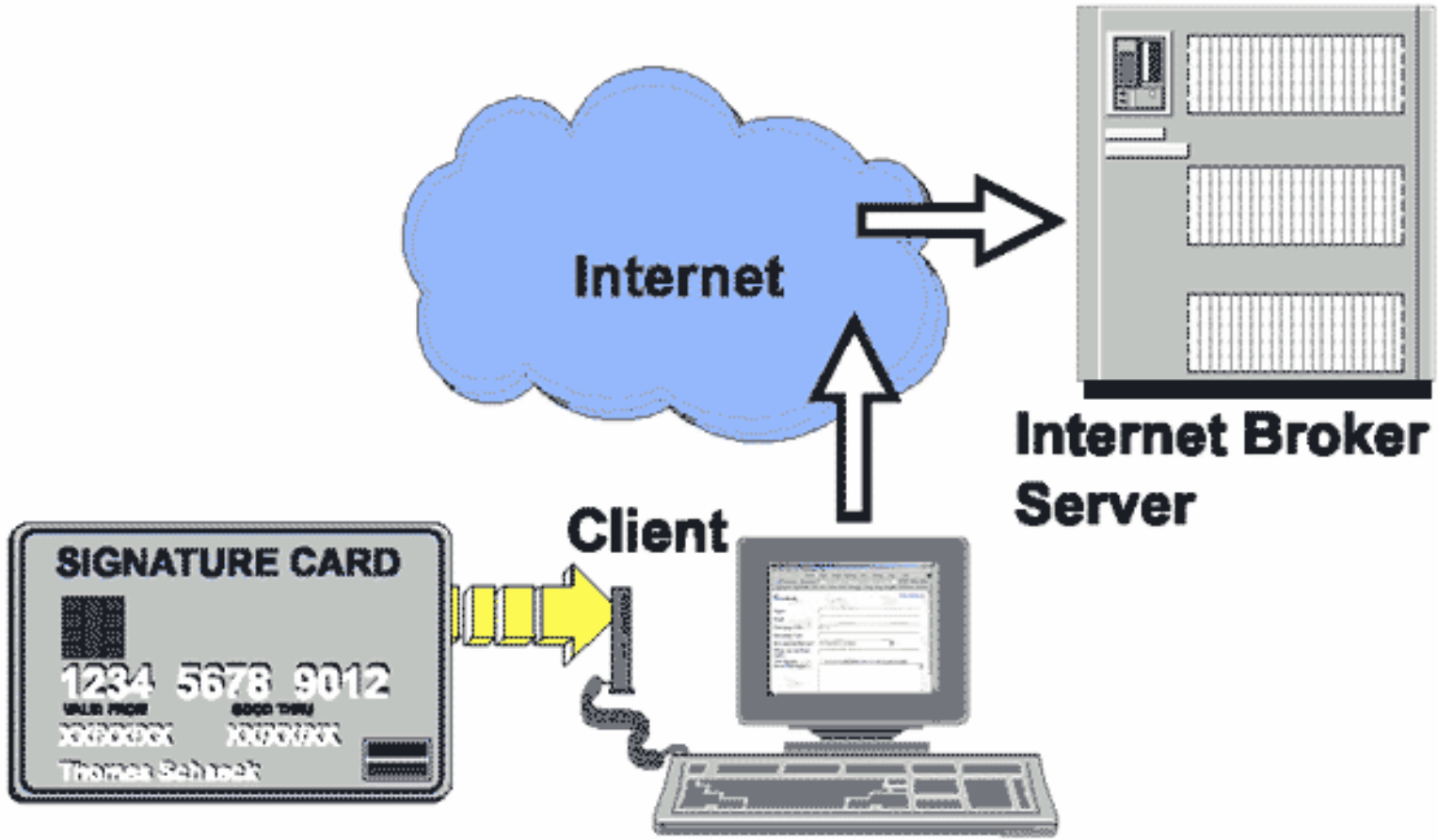
M6: Internet Payment & Banking

4. Smart Card System: Components



M6: Internet Payment & Banking

4. Smart Card System: Usage over the Web



M6: Internet Payment & Banking

4. Smart Card System: Mondex

- ✓ Mondex is an **innovative electronic cash system** that combines the best features of **traditional cash** with the **convenience of electronic payment.**

- ✓ Mondex electronic cash is **digitally stored** on a reloadable and highly secure **microprocessor computer chip**. The chip is embedded in a plastic card that looks and feels similar to a debit or credit card. (See Right →)

- ✓ Mondex will **enable retailers to receive Mondex cash immediately** at the time of transaction, without settlement or clearing. And, with its distinct flexibility and state-of-the-art security, Mondex is equally at home in the physical world of the corner store or the virtual world of electronic commerce.

M6: Internet Payment & Banking

Internet Banking: History & Functions

- ✓ Historical Banking Industry
  - o Physical Banking Offices & Buildings
  - o Paper Based Documents and Processes
- ✓ 1980's Banking
  - o Telephone Banking
  - o Account Balances, Funds Transfer, Electronic Bill Payment
  - o ATM: Automated Teller Machines
- ✓ Mid-Late 1990's Banking
  - o Electronic Banking
  - o Web-Based Presence
  - o Competitive Pressure
- ✓ **Functions** provided by Banks:
  1. Handle Cash
  2. Investments
     - o Savings
     - o Securities
  3. Loans / Credit
  4. Bill Payments
     - o Paper Based (checking)
     - o Electronic
  5. Insurance

M6: Internet Payment & Banking

Internet Banking: Transaction Costs

Banking Transaction Costs

	Average Cost / Transaction	
Full Service Branch	$	1.07
Telephone	$	0.54
ATM	$	0.27
PC Banking	$	0.02
Internet	$	0.01

[Source: Booz Allen & Hamilton Banking Survery; July , 1996]

M6: Internet Payment & Banking

Internet Banking: 4 Phases – Services & Benefits

	Phase One: **Marketing and Promotion**	*Phase Two:* **Light Interactivity**	*Phase Three:* **Full Transactions and Services**	*Phase Four:* **Strategic Usage**
Focus	*Marketing Web site*	*Customer acquisition*	*Banking functionality*	*Strategic change*
Primary Services	• Published information on bank services • Branch / ATM map • Customer service e-mail	• Loan calculators • Credit card applications • Savings, checking account applications • Financial Planning articles, advice	• Account look-up, balances, transfers • Bill payment • Car loans, credit cards, mortgages • Statement review • Cleared check presentment	• Sophisticated cross-selling of new services • Customer profitability analysis • Bill presentment & payments
Primary Benefit	• Provide information to customers and prospective customers	• Reducing paperwork • Low-cost ways to attract and impress customers	• Retention of existing customers • Attracting high-value customers • Reduction in service costs	• Increased service offerings • New revenue opportunities • Increased margins

http://www.dynamicnet.net/news/white_papers/internetbanking.htm

M6: Internet Payment & Banking

Internet Banking: Disadvantages

- ✓ **New developing technology**: Internet Banking is a developing technology supporting self-service delivery channel. Developing technologies such as Internet Banking, though, run the **risk of getting too far of ahead** of the banks; therefore, the banking industry will not be able to sell to the customer.
- ✓ **Unknown Strategy**: The banking industry's biggest challenge is in establishing an electronic banking strategy and fully understanding its options and implications. The Internet is a **new alternative delivery channel**, which **requires new thinking and marketing efforts**.
- ✓ **Investment Cost**: The **initial cost** investment of Internet Banking technology is **higher** than the other forms of alternative delivery systems. Due to inexperience, banks that attempted to establish Web home pages run up against major problems.

M6: Internet Payment & Banking

Internet Banking: Disadvantages (cont)

- ✓ **Security**: The Internet is a security **nightmare** because of its characteristics: public, open, network of peer to peer networks, flat and mesh topology, connectionless datagram routing, no central authority, protocols based on mutual trust, and naïve users. Banks need to **establish an infrastructure** that incorporates both **security policies** and **management staff to support information security**.
- ✓ **User Knowledge Barrier**: **Not everybody** has the **expertise** needed in order to access to home banking in the way it is today. A **minimum knowledge on PC's an Internet is needed** and this suppose a barrier of access for many users.

M6: Internet Payment & Banking

Internet Banking: HSBC Demo

1/8: Login Screen

2/8: View Account

http://www.banking.us.hsbc.com/InternetBanking/demo.asp

M6: Internet Payment & Banking

Internet Banking: HSBC Demo (cont)

3/8: Account Summary

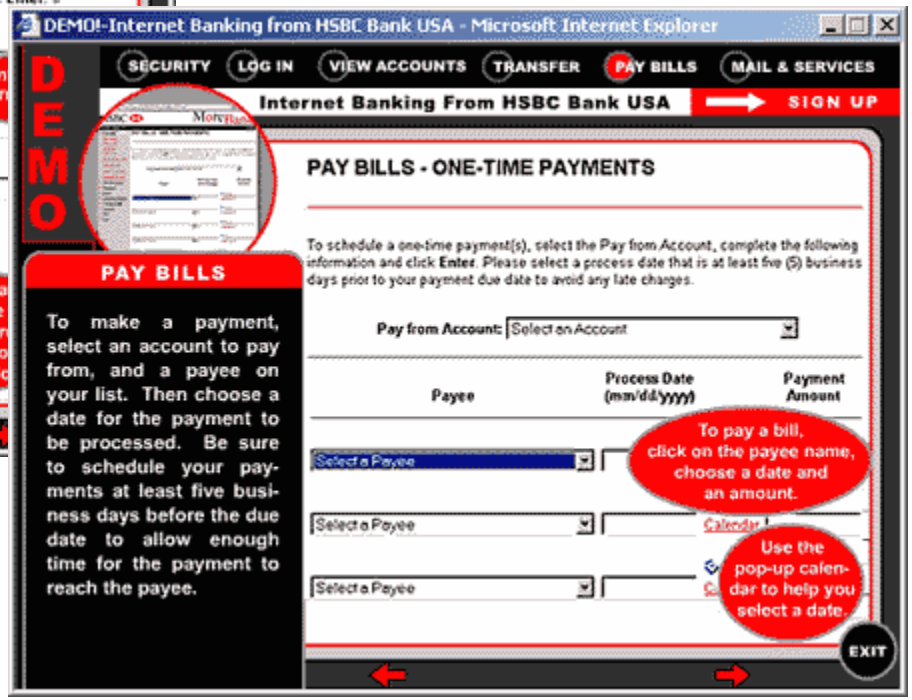
4/8: Transfer between accounts

M6: Internet Payment & Banking

Internet Banking: HSBC Demo (cont)

5/8: Adding a payee

6/8: Making payment

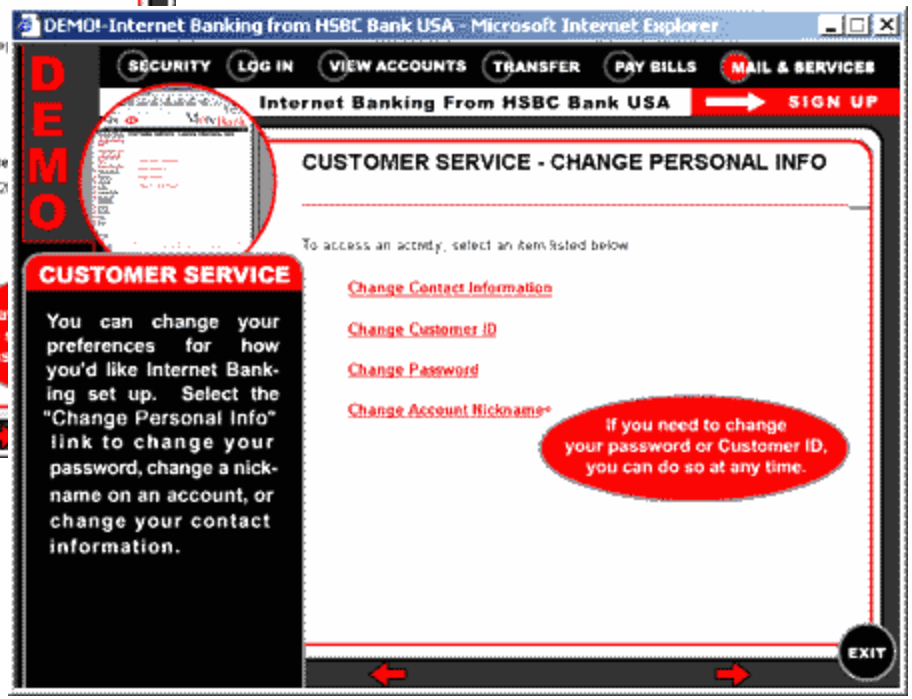


M6: Internet Payment & Banking

Internet Banking: HSBC Demo (cont)

7/8: Read mail

8/8: Customer Information



M7 Security Issues in Electronic Commerce

Paper on ”An Overview of Security Issues for Electronic Commerce and Electronic Service Delivery”

An Overview of Security Issues for Electronic Commerce and Electronic Service Delivery

Prepared as background information for the federal/provincial/territorial videoconference on information technology security
by M. Harrop,
AEPOS Technologies Corporation

March 12, 1998

Introduction

Effective security is a pre-requisite to the widespread use and acceptance of electronic commerce and electronic service delivery. As administrations and businesses seek to replace paper processes and transactions by their electronic equivalents, it will be necessary to establish broad agreement not only with respect to the transactions themselves and the way they are processed, but also with respect to the protective techniques used.

This background paper introduces some of the important general concepts and terminology of information technology (IT) security and then describes some of the specific techniques that have particular relevance to electronic service delivery and electronic commerce. The need for harmonization of techniques and processes to achieve wide-scale interoperability is also discussed.

A glossary of terms and a short bibliography are included.

Assets and Vulnerabilities

Class Activity 1: Assignment 2 Discussion

Weighting: 30%, Due: 25 September 2000

1. Choose one Web site from the different categories shown below:

- o Online Retail
- o Online Publishing
- o Health Care Industry Online
- o Travel and Transportation
- o RealEstate
- o Stock Market
- o Online Entertainment
- o Online Procurement
- o Online Professional Services
- o Financial Services Online

1.1 Describe the **specific benefits** that you think flow to this enterprise from **enabling this enterprise for e-Business**. These must be specific benefits which may vary from enterprise to enterprise.

1.2 With which **model** of e-Business does this enterprise comply? With which model should it comply?

1.3 Examine and comment on its **effectiveness** from the viewpoint of **Internet Marketing**. Your answer must be presented in the form of an essay.

Class Activity 1: Assignment 2 Discussion

Weighting: 30%, Due: 25 September 2000 (cont)

2. Choose an organization with which you are familiar but which has **no Web presence**. For example it could be your own enterprise or another enterprise that you know reasonably well.

2.1 Write a report to management which proposes **specific strategies** that should be adopted **to implement an e-business solution** to this organisation. Your report should produce **recommendations** along with **specific actions** that could then be used by Web developers to develop a Web site for the chosen organisation.

Class Activity 2: Reading
"Business Models on the Web"

BUSINESS MODELS ON THE WEB

Michael Rappa

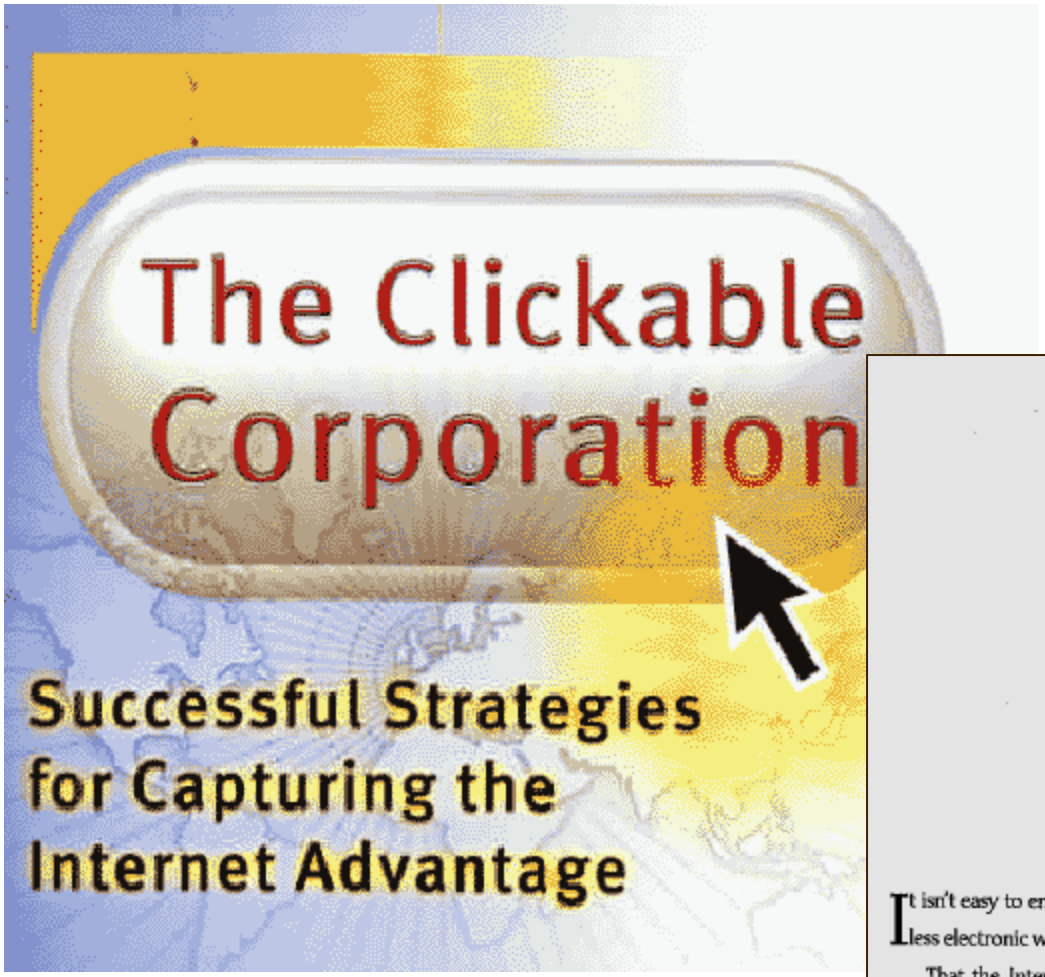
Business models are perhaps the most discussed and least understood aspect of the web. There is so much talk about how the web changes traditional business models. But there is little clear-cut evidence of exactly what this means.

In the most basic sense, a business model is the method of doing business by which a company can sustain itself -- that is, generate revenue. The business model spells-out how a company makes money by specifying where it is positioned in the value chain.

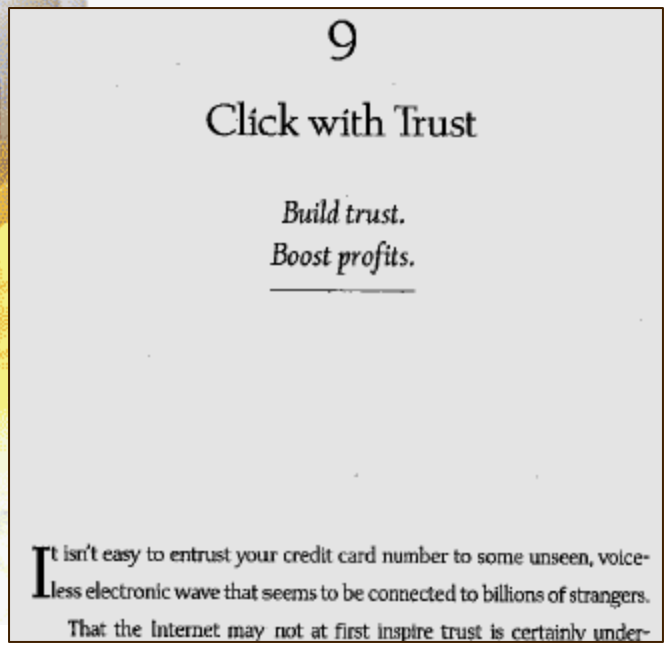
Some models are quite simple. A company produces a good or service and sells it to customers. If all goes well, the revenues from sales exceed the cost of operation and the

Class Activity 3: Case Studies (3x)

"Clickable Corporation", Chp 9 – Click with Trust



- ✓ MetLife
- ✓ Wells Fargo
- ✓ Charles Schwabs



9

Click with Trust

Build trust.
Boost profits.

It isn't easy to entrust your credit card number to some unseen, voiceless electronic wave that seems to be connected to billions of strangers. That the Internet may not at first inspire trust is certainly under-

Additional Handouts for Lecture 3

- ✓ 1. ”An Overview of Security Issues for Electronic Commerce and Electronic Service Delivery”
- ✓ 2. Business Models on the Web
- ✓ 3. “Clickable Corporation”, Chp 9 – Click with Trust

What's in Store for Lecture 4

- ✓ Module 8. Legal & Ethical Issues
- ✓ Module 9. Tax & Electronic Commerce
- ✓ Module 10. Government Policies
- ✓ Future Trends
- ✓ Case Studies, Discussion

End of Lecture 3

Good Night.