سیستم های پرداخت الکترونیکی

Characteristics of current payment systems

CHAPTER 2

Agenda

- Introduction
- 1 Cash payments
- 2 Payment through banks
- 3 Using payment cards
- 4 Consumer preferences in payment systems
- 5 Regulatory framework

Introduction

- Payment progression

  - Barter (needs double coincidence of wants)

  - Commodity money (gold)

    Portable
    &
    Divisible

  - Use of tokens

    backed by deposits of gold

    fiat money (government declaration)

Use of Tokens

- Representative Money
  - The value of the token is backed by a commodity (e.g. gold or silver).
  - Was in use until 1971 (Gold backed Dollar).
- Fiat Money
  - The value of the token is based on the confidence on Issuer.
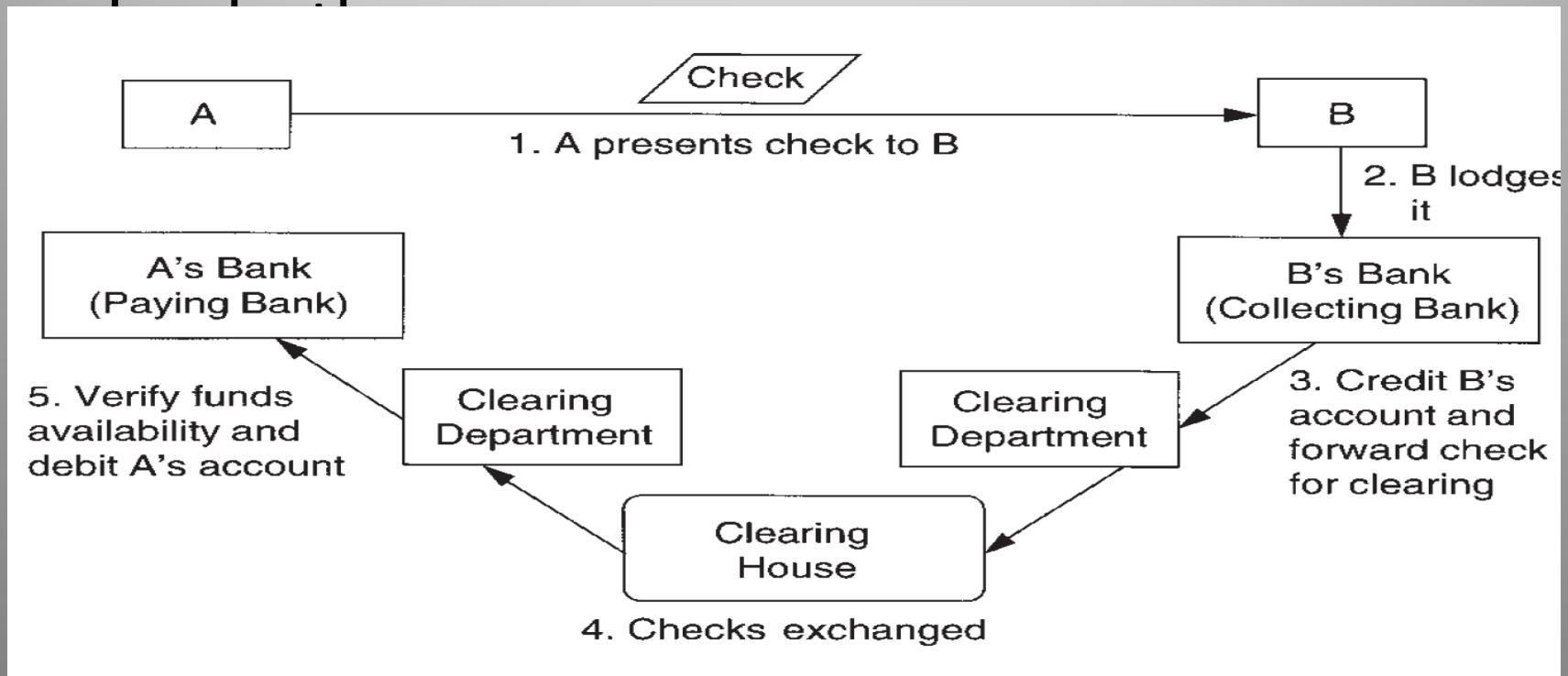 - Governments exclusively issue this type of money.

Fiat Money's Value

- The value is based on acceptance by government for tax payments.

- National Debt: is amount of money the government has generated(!?) with hope to receive from future taxes and other incomes.

- In economic crisis the value of fiat money will drop by lack of confidence.

Cash payments

- Quite portable (paper form)
- No levied charges for transactions
- No audit trail
- Cash is not free
  - Notes are destroyed and replaced with newly printed ones
  - Vaults must be built to store it
  - Heavy insurance premiums paid to cover losses due to theft
  - Counterfeiters (color photocopying)

Payment through banks

- Check: an order to bank to pay a specified amount to the named payee

- If the parties hold accounts with separate banks, the

- Check
- A → B: 1. A presents check to B
- 2. B lodges it
- A's Bank (Paying Bank)
- B's Bank (Collecting Bank)
- 3. Credit B's account and forward check for clearing
- 5. Verify funds availability and debit A's account
- Clearing Department
- Clearing Department
- Clearing House
- 4. Checks exchanged

(Check) Returned items

- If any problem occur
  - Funds are not available
  - The signature on the check does not match with samples
- The principal loser in this situation is B

(Check) Truncation

- To keep the check at the collecting bank and forward the transaction details electronically through the clearing system.
  - E.g. Scanned image of the check

- Forbidden by law in some jurisdictions
  - E.g. United Kingdom

Payment by giro or credit transfer

- Eliminates returned items problem
- An instruction to the payer's bank to transfer funds to the payee's bank
- Difference with Check:
  - The transaction cannot be initiated unless A has the funds available

Payment by giro or credit transfer
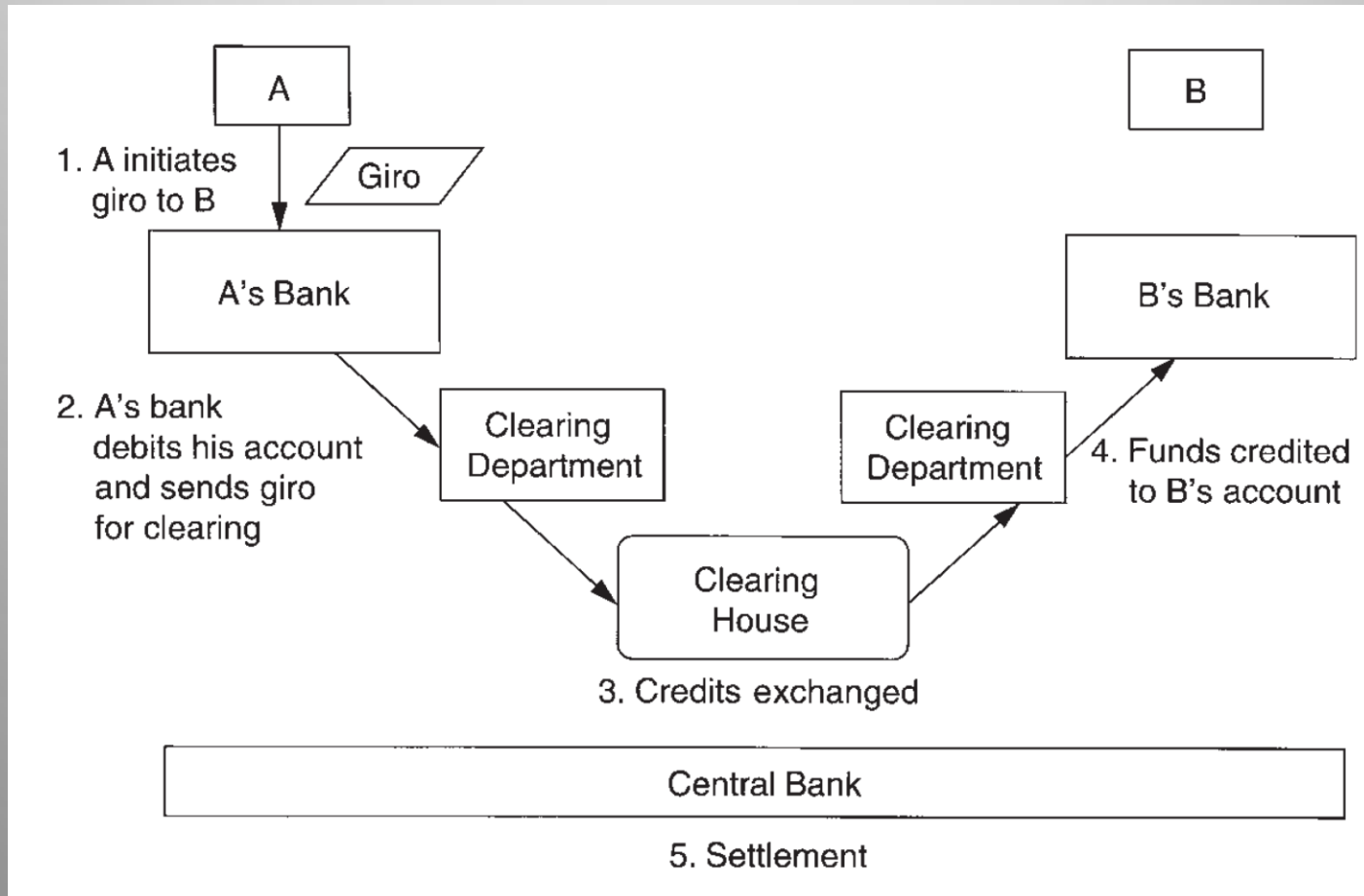
Automated clearing house (ACH) payments

- The payment instructions are in electronic form
- Real-time transactions sent on telecommunications links
- corporate cash disbursement (CCD)
  - 94-character message
  - Identifies the payee, amount, and …
  - Standard Formats
    - The electronic data interchange (EDI) Community
- The Worldwide Automated Transaction Clearing House (WATCH)

Wire transfer services

- ## High value payments (More Secure)

Noncash Payments

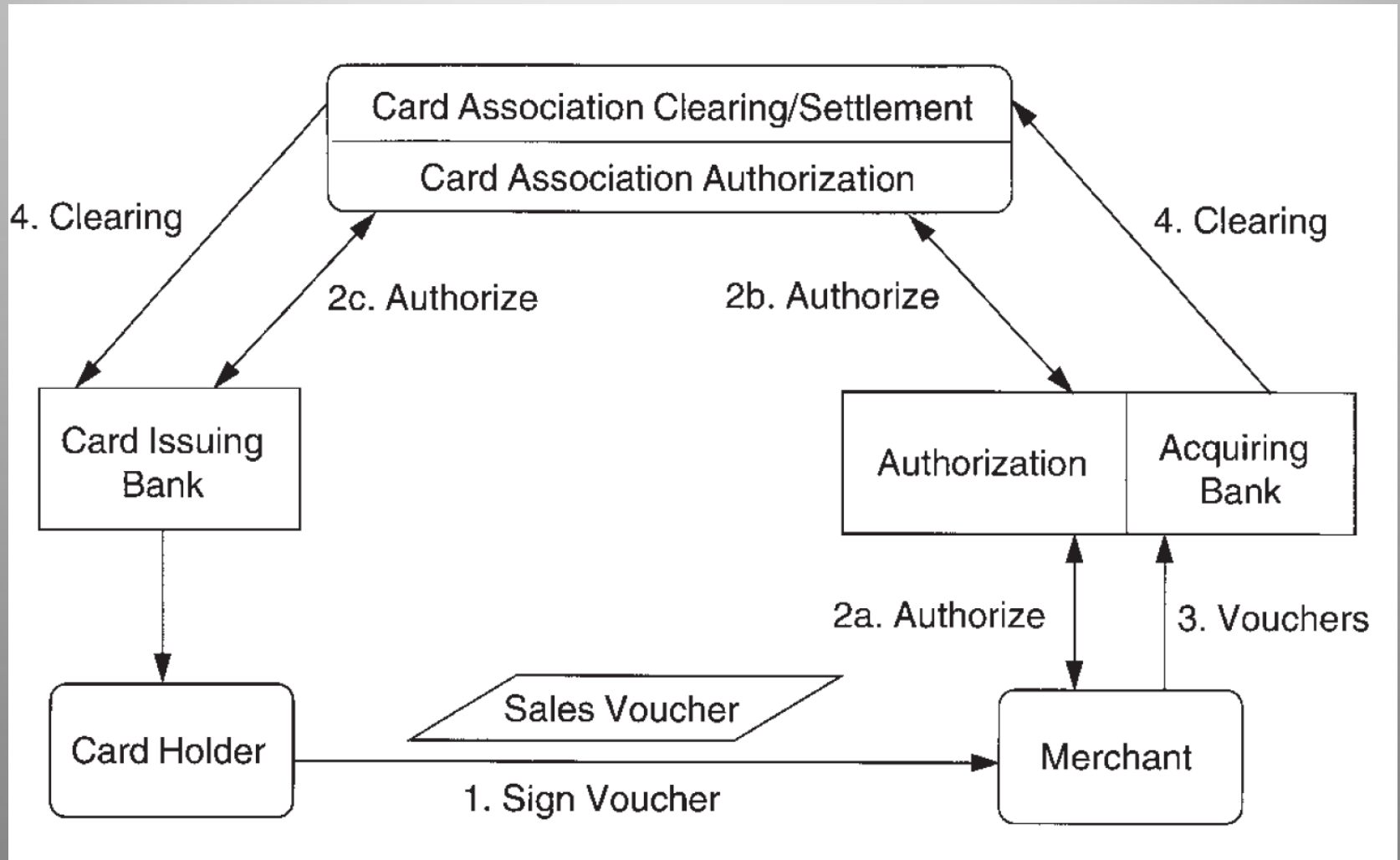| Payment Instrument	Transaction Volume	Transaction Value	Average Value
Check	71%	10%	$1,179
Credit/Debit Card	25%	0.1%	$59
Credit Transfer (ACH)	2%	1%	$2,845
Debit Transfer (ACH)	0.5%	1%	$1,583
Wire Transfer	0.1%	86%	$4,325,605

Payment cards

American Express

Visa International

MasterCard

- Card-issuing bank (for customer)

- Acquiring bank (for merchant)

- Authorization: verifying that the card does not appear in a blacklist of cards

- Merchant clears sales vouchers on behalf of the card associations

Paper elimination from credit card transactions

- sales vouchers with the cardholder's signature only come into play when a dispute arises

Other possibilities

- Charge card
  - the balance must be paid in full at the end of the period

pay before (electronic purse)

payment cards

pay now (debit cards)

pay later (credit cards)
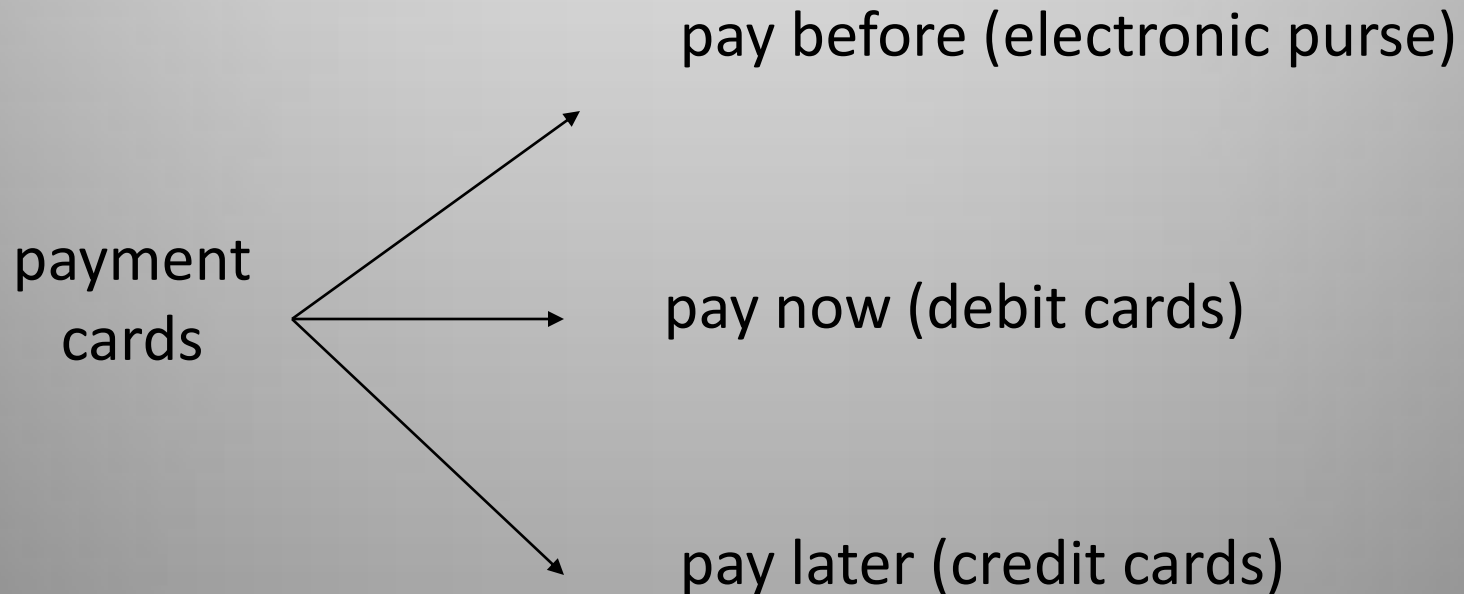
Consumer preferences in payment systems

- Noncash Payment Methods by Country in 1998

Country	Use of Checks	Use of Credit Transfers (Giros)	Payment Cards	Direct Debits
United States	70%	3.7%	24.3%	2.0%
The Netherlands	1.9%	45.0%	24.5%	28.5%
United Kingdom	28%	19.3%	33.1%	19.4%
Germany	4.8%	50.6%	5.1%	39.5%
Turkey (1997 figures)	6.9%	2.6%	83.9%	—
Namibia (1996 figures)	75%	14%	Not provided by national banks	9%

Regulatory framework

- National central bank regulation

  - (insurance) Consumers are protected from the consequences of bank failure

- Electronic payment regulation

  - electronic extensions of existing bank operated payment methods

  - changes in policy required to cope with the electronic purse

  - levying of taxes on transactions that take place electronically

  - money laundering

Electronic Cash's Issues

- How is the issued e-cash is backed by physical cash?

  – By precious metals

  – By issuing banks.

  ➢ Needs Central Banks Regulation.

- A registration system is required to prevent money laundering and help governments to tax the electronic transactions.

GoldMoney, e-gold, …

Possible generation of too much e-cash compared to available assets

Regulations

- United states:
  - no regulations on issuing banks.
  - Same rules (as physical) to prevent money laundering.
  - e-gold's trial
    - conspiracy to engage in money laundering
    - operation of an unlicensed money transmitting business.
    - The company pled guilty.
- EU: basic regulations from 1999.

Credit card based systems

Chapter 4

Agenda

- Mail order/telephone order (MOTO) transactions
- Unsecured network payments
- First Virtual
- Once-off credit card numbers
- The secure socket layer (SSL)
- i-Key protocol (iKP)
- Secure Electronic
- Transactions (SET)

Visa Credit Card

- A scheme by the Bank of America

- licensed by Barclaycard in the United Kingdom in 1966

- 21,000 member financial institutions (2000)

- 1 billion cards

- 19 million merchants in 300 countries

Usage of Visa and MasterCard Cards in 1999

	Visa		**MasterCard**	
	Sales volume, billions of dollars (U.S.)	Number of cards (millions)	Sales volume billions of dollars (U.S.)	Number of cards (millions)
Totals	$1,590	997.4	$726	390.2
Combined	$2.3 trillion sales		1.3 billion cards	

Payment card schemes

- Credit cards

- Debit cards (paperless check)

- Charge cards
  - entire bill must be paid at the end of period
  - no spending limit

- Travel and entertainment cards
  - linked to airlines, hotels, restaurants, car rental companies

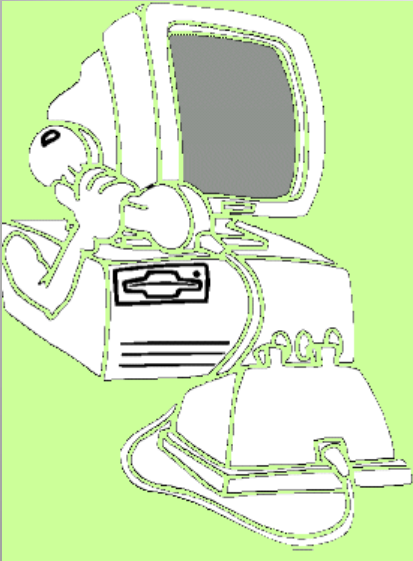# Entities involved in a conventional credit card transaction
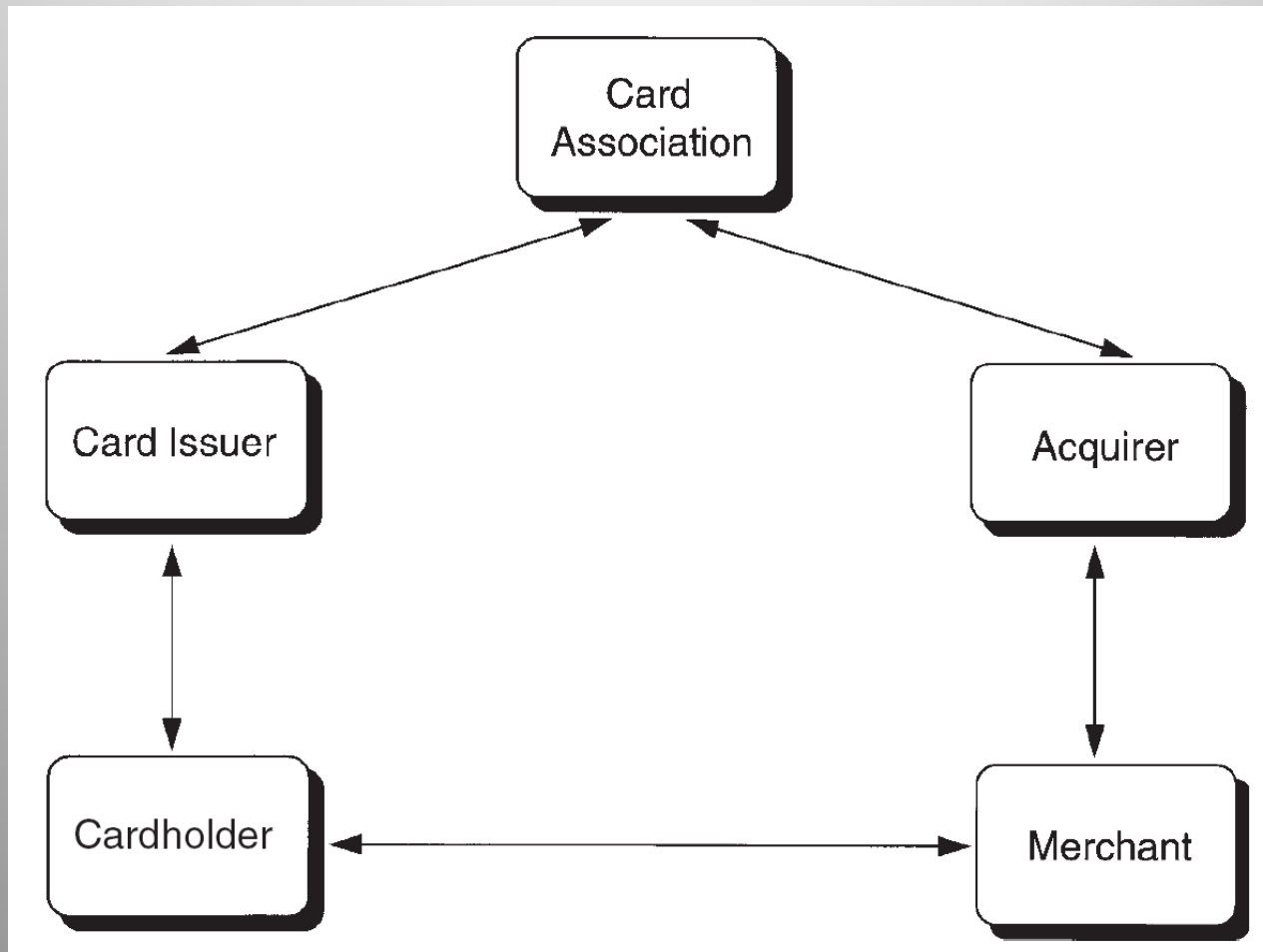
Mail order/telephone order (MOTO) transactions

- Payments without requiring the buyer and merchant to be colocated
- Very popular form of payment
- Possibilities for fraud
- There is no cardholder signature involved
  - risk for merchants

Unsecured network payments

- Payments across computer networks
  - Similar to MOTO
- Interception of credit card details
- (Processing speed) fraudsters can generate vast numbers of orders
- (Global scope of the network) reaching blacklist on time to all relevant merchants

First Virtual

- VirtualPIN (<u>without</u> encryption)

- Merchants and buyers registeration

- The First Virtual server also had an involvement in every transaction and at intervals lodged the proceeds to the merchant's bank account.

Buying with First Virtual.
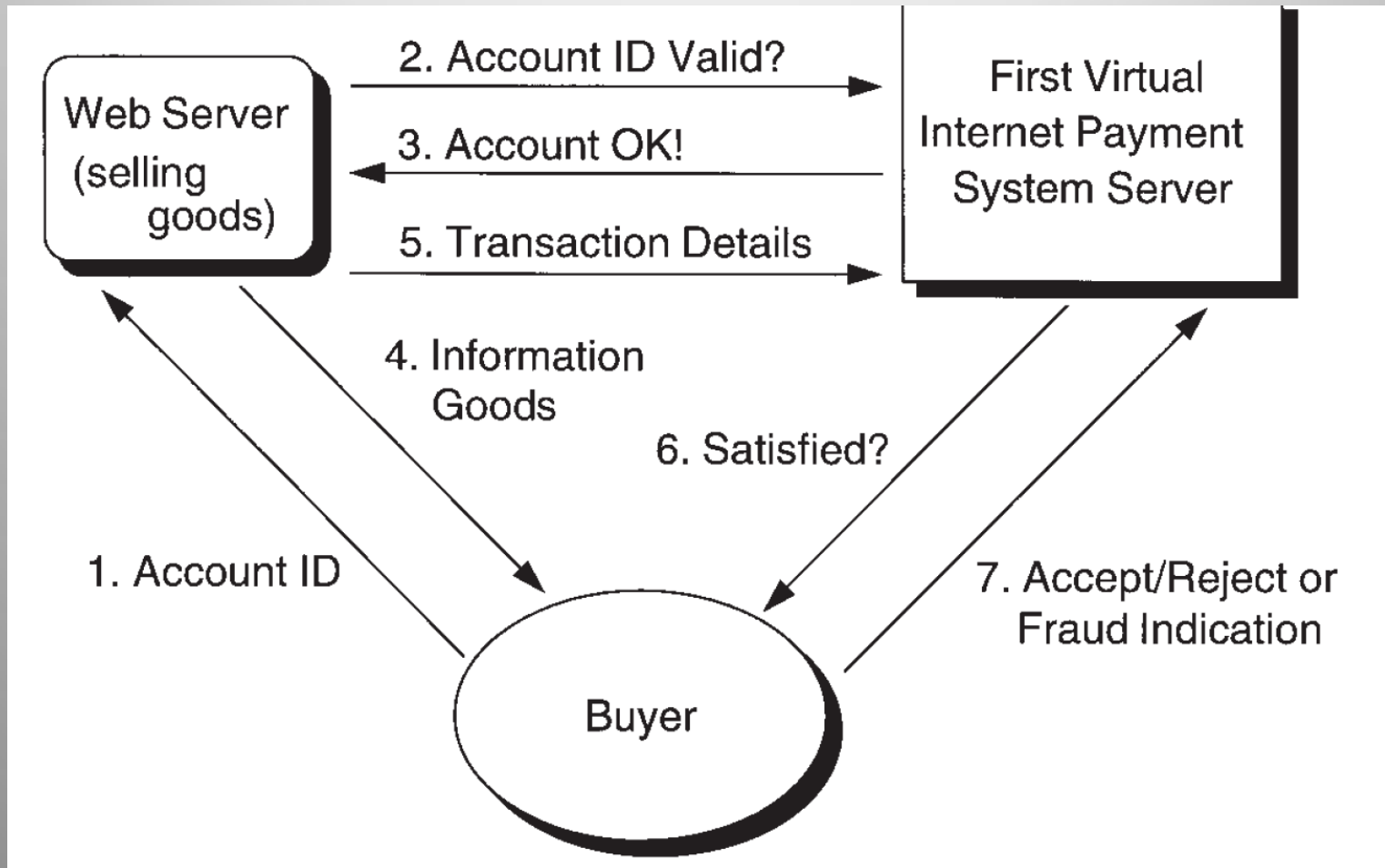
Once-off credit card numbers

- disposable credit card number each time something is purchased
  - O-card securely establishes a link with the card issuer system
  - generates a new credit card number

Orbiscom's O-card one-time credit card system