

PAYMENT SYSTEMS

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THE PAYMENT REVOLUTION

- ❖ In 2011 we are still in the middle of a payment system revolution
- ❖ Electronic payments are taking the place of cash and checks
- ❖ In 2003 electronic systems surpassed the use of cash and checks in stores
- ❖ Similar trends occur for recurring payments, more than 75% in 2001 were made by electronic systems

THE PAYMENT REVOLUTION - II

- ❖ The cashless society has been discussed for a long time



THE PAYMENT REVOLUTION - III

- ❖ The demise of cash and checks is not imminent
- ❖ Many individuals *can* live without them
- ❖ In the B2C online world, we already do
 - ❖ Credit cards plays a major role
 - ❖ In most countries, it is difficult to start a business without support in credit cards

E-PAYMENT FACTORS

- ❖ The short history of e-payments is littered with remains of companies that tried to introduce new payment systems
- ❖ Difficult: chicken and egg problem
- ❖ When planning or evaluating a new payment system, a span of factors must be taken into consideration

INDEPENDENCE

- ❖ Most payment systems require the buyer to install additional hardware, or the seller to use specific software
- ❖ The most expensive/difficult are the hw/sw requirements, the less likely is the e-payment to succeed

INTEROPERABILITY/PORTABILITY

- ❖ An e-payment system must mesh with existing systems and applications
- ❖ Must be supported by standard platforms

SECURITY

- ❖ The money transfer *has* to be secure
- ❖ Usually the risk for the customer must be lower than the risk for the seller

ANONIMITY

- ❖ Some buyers prefer to be anonymous
- ❖ Cash is anonymous, credit card is not

DIVISIBILITY

- ❖ Credit cards have problems addressing low or high payments
- ❖ Any method is likely to be address if you can buy both a candy and an airplane with it

EASE OF USE

- ❖ In B2C credit cards have become the standard also for their ease of use
- ❖ Ease of use is important for customers

TRANSACTION FEES

- ❖ The lower the transaction fees, the better
- ❖ For both customers and sellers
- ❖ Credit cards have high transaction fees (up to 3%)

INTERNATIONAL SUPPORT

- ❖ E-Commerce is worldwide, so any e-payment method must be easily adopted in different countries

REGULATIONS

- ❖ Any new payment system must adhere to a number of national and international law regulations

PAYMENT CARDS

PAYMENT CARDS

- ❖ A payment card is a plastic card containing information that can be used for payment purposes
- ❖ Usually emitted from a financial institute
- ❖ In general, payment cards offer:
 - ❖ getting cash from ATM (bancomat in Italy)
 - ❖ pay directly to sellers with POSs
 - ❖ pay online

CREDIT CARDS

- ❖ Credit cards allow the user to buy products and services
- ❖ Bases on the holder's promises to pay for the goods
- ❖ The issuer grants a line of credit to the user
- ❖ Credit cards allow the user to be in debt, but the debt is subject to interest



DEBIT CARD

- ❖ The funds are withdrawn directly from the user bank account
- ❖ Used for both direct payments or for cash withdrawal
- ❖ In Italy are known as “carte bancomat” from the name of the first issuer



STORED-VALUE CARDS

- ❖ Stored value cards works similiary to debit cards, but the funds are not withdraw from the user's bank account
- ❖ The funds are taken from a pre-paid monetary value
- ❖ One major difference with credit and debit cards: stored value cards can be anonymous
- ❖ Major player in Internet payments



TYPES OF SVC

- ❖ Stored value cards come in two types
 - ❖ closed loop: issued by a specific merchant or merchant group (i.e. Ikea Gift Card)
 - ❖ open loop: used to make any kind of transaction (Postepay)

PROCESSING CARDS ONLINE

- ❖ Two major phases
 - ❖ Authorization: determine if the buyer's card is active and if there is enough money in the account
 - ❖ Settlement: transfer of money from the buyer's to the merchant's account

ONLINE PAYMENTS PARTICIPANTS

- ❖ Acquiring bank (Banca Sella, ...)
- ❖ Credit card association (Visa, Mastercard, ...)
- ❖ Customer
- ❖ Issuing Bank
- ❖ Merchant
- ❖ Payment processing service
- ❖ Processor

CARD FRAUDS

- ❖ In the online world, merchants are held liable for fraudulent transactions
- ❖ Managing online frauds continues to be a significant problem for online merchants

ANTI-FRAUD TOOLS

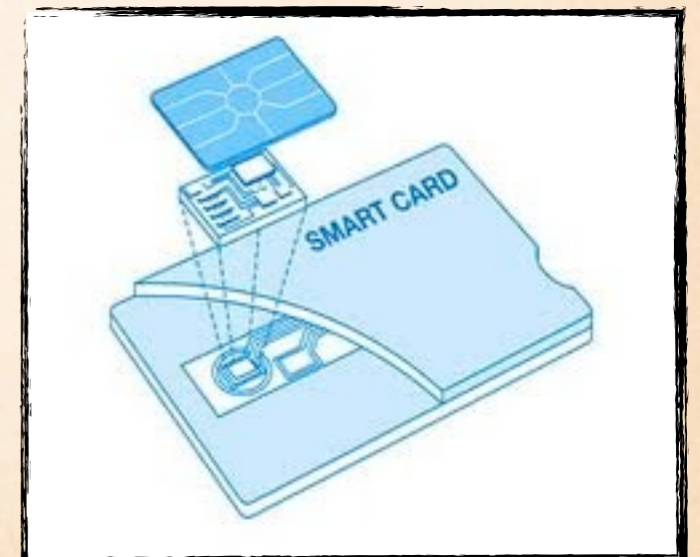
- ❖ Address Verification: compare the entered shipping address with the card address; possible false positives
- ❖ Manual review: staff to manually review some orders
- ❖ Automatic decision models: rules to determine if a transaction is fraudulent
- ❖ Card verification number: CVN/CCV ask for the number on the back of the card

ANTI-FRAUD TOOLS

- ❖ Card association additional verification services: Verified by Visa, SecureCode, etc.
- ❖ Negative lists: maintain a negative list of IPs, names, addresses, etc
- ❖ In 2003 the rejection rate was about 4%
- ❖ Problem: a number of rejected orders are valid (lost revenue)

SMART CARDS

- ❖ A smart card is a payment card with an embedded chip
- ❖ Can be a microprocessor or just a memory chip
- ❖ The chip is activated/read by some other device (i.e. ATM)
- ❖ Can be contact or contactless
- ❖ Can need a PIN before being used
- ❖ You *can* hack into a smart card, but it is a “class 3” attack (the costs exceeds the benefits)



E-MICROPAYMENTS

E-MICROPAYMENTS

❖ Scenarios

❖ buy a song from iTunes: 0.99\$

❖ buy an archived newspaper in digital form: 1.50\$

❖ play an online game for 30 minutes: 2.00\$

❖ buy an image for your website: 0.80\$

E-MICROPAYMENTS - II

- ❖ Credit cards are not well suited for payments under 5\$
- ❖ Merchants have a fixed per-transaction fess of $\sim 0.20\$$ (other then the $\sim 3\%$)
- ❖ Moreover, small payments are often made by young customers (< 18) that do not own a credit card

ITUNES MUSIC STORE

- ❖ Apple's iTunes, for instance, sell songs at 0.99\$ each
- ❖ Also applications are offer prices under 3\$
- ❖ To reduce fixed costs, Apple aggregate multiple purchases (24h span) to charge the customer card only once

MICROPAYMENT SOLUTIONS

- ❖ Since 2000 a number of companies attempted to address the problem of micropayments
- ❖ Digicash, First Virtual, Cybercoin, Millicent, Internet Dollar
 - ❖ all went bankrupt during the dot-com crash
- ❖ Bitpass had some success, but shut down in 2007

MICROPAYMENT MODELS

- ❖ Currently, there are 5 micropayment models that do not depend directly/solely on credit cards that have some success

AGGREGATION

- ❖ Payments from a single customer are batched together and processed after a period of time or a monetary threshold
- ❖ Well suited for vendors with high repeating purchases
- ❖ Apple iTunes

DIRECT PAYMENT

- ❖ Micropayments are added to the bill of an existing service, like the mobile phone monthly bill
- ❖ PaymentOne, Paymo, allow to add purchases of any size to the phone bill
- ❖ Model used to sell ringtones and other services by phone companies

STORED VALUE

- ❖ Upfront payment to a debit account
- ❖ Used recently by Steam, and also offline by Starbucks, music-download services, etc.

SUBSCRIPTIONS

- ❖ A single payment is made for a period of time of access to a service
- ❖ Used by online gaming companies and a small number of online newspapers

À LA CARTE

- ❖ Vendors negotiate for lower credit or debit fees

RESPONSE TO MICROPAYMENTS

- ❖ In response to the growing of micropayments alternatives Visa and Mastercard lowered their fees in 2005
- ❖ Also Paypal entered the mp market with an alternative fee structure for payments under 7\$

PAYPAL

PAYPAL

- ❖ Paypal is an online payment processor
- ❖ Now owned by eBay
- ❖ The first successful Internet-based e-commerce payment system

HOW PAYPAL WORKS

- ❖ Trusted third-party between sellers and buyers
- ❖ Securely stores credit cards data
- ❖ Process both one-time and recurring payments



PAYPAL NUMBERS

- ❖ Growth from an handful of users in 1999 to 87Millions in 2010 (active accounts, in 190 nations)
- ❖ In 2009 Paypal processed \$71 Billion in payments (roughly half from eBay)
- ❖ 15% share on e-commerce payments in USA, 9% outside

PAYPAL SUCCESS

- ❖ Viral effect
- ❖ Commissions are more or less the same of credit cards
 - ❖ $0.30\$ + 1.9\% - 2.9\%$
- ❖ Merchants do not have to own a bank account
- ❖ Consumers are not charged directly

PAYPAL INCOME

- ❖ Transaction fees
- ❖ Interests on stored values

PAYPAL COMPETITORS

- ❖ Google Checkout
- ❖ Amazon Payments
- ❖ Twitter, Facebook, Apple are also planning new services



MOBILE PAYMENTS

MOBILE PAYMENTS

- ❖ Instead of using cash or cards a consumer can use a mobile phone to pay for a wide range of services and goods
- ❖ You already have the hardware in your pocket!



MOBILE PAYMENTS - II

- ❖ There are 5 billions of cell phones around the world
- ❖ More prevalent than smartcards
- ❖ Major payment system in Japan
- ❖ Embedded RFID chips for contactless payments with PIN
- ❖ Smartphone can be equipped with NFC (Near Field Communication) to communicate with reader about 4cm away

MOBILE PAYMENTS - III

- ❖ Other approaches
 - ❖ Freecash: make the payment from your phone, show a barcode to the merchant (does not require new hardware)
 - ❖ Paypal Mobile
 - ❖ Obopay
 - ❖ Google gPay, based on text messages

MOBILE PAYMENTS - IV

- ❖ Mobile payments will be probably growing fast in the next years
- ❖ Japan is the leading country

PAGAMENTI MOBILI IN ITALIA

- ❖ PosteMobile di Poste Italiane: associare un conto Bancoposta o carta PostePay con la SIM del cellulare
- ❖ ATM SostaMilanoSms: parcheggio via sms
- ❖ Sky e Mediaset Premium: pay-per-view via sms
- ❖ Trenitalia, CartaSi, Movicon, ...

CONCLUSIONS

- ❖ We are in the middle of a payment revolution
- ❖ Smartphone could have a major role