



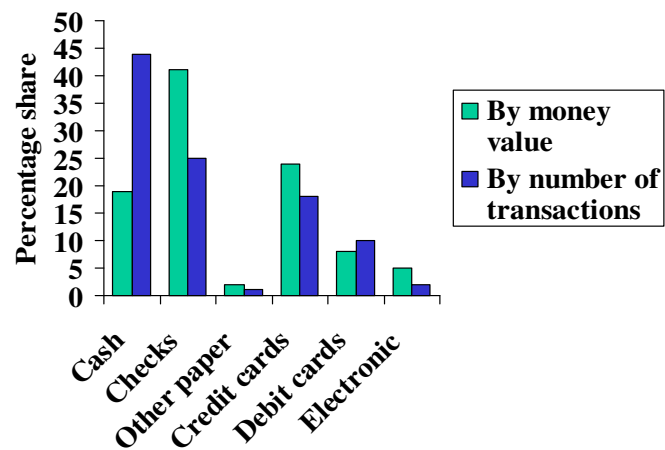
# Charging and billing (C&B)

S-38.041 Networking Business



# Traditional payment systems

US market - Value and volume of payments

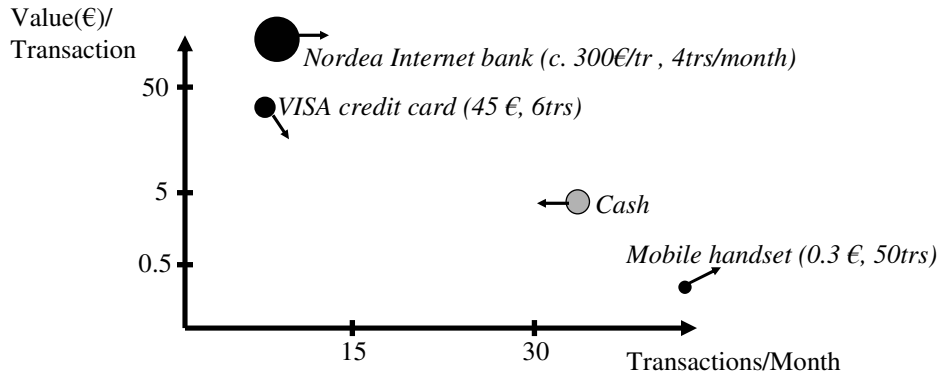


Source: U.S. Census Bureau, 2002



# Traditional payment systems

Finland



- Role of cash decreasing very slowly
- Mass of micropayments to be optimized



# Traditional payment systems

Key features

	Cash	Credit card	Debit cards	Accumulating balance
Cost per transaction	low	high	high	low
Merchant fixed cost	low	high	high	high
User fixed cost	0	high	low	low
Merchant fee	0	3-5%		
Account required	no	yes	yes	yes
Anonymous	yes	no	no	no
Risk for consumer	yes	limited	limited	no
Risk for merchant	no	yes	no	yes

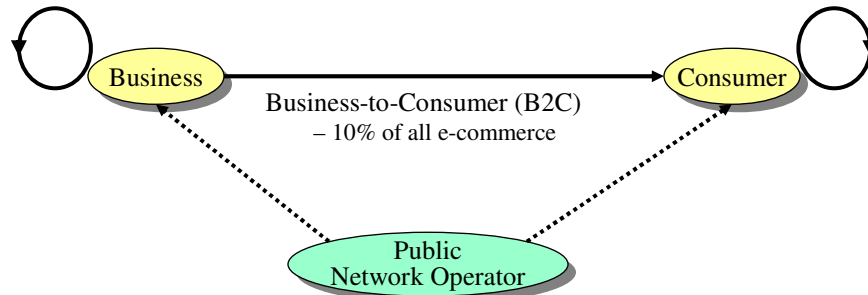


# E-commerce

## Basic business sectors

Business-to-Business (B2B)  
– 90% of all e-commerce

Consumer-to-Consumer (C2C)  
– 1% of all e-commerce



### Role of network operators

- Access and transport service provider
- Charging for small content transactions of consumers



# E-commerce

## Revenue models

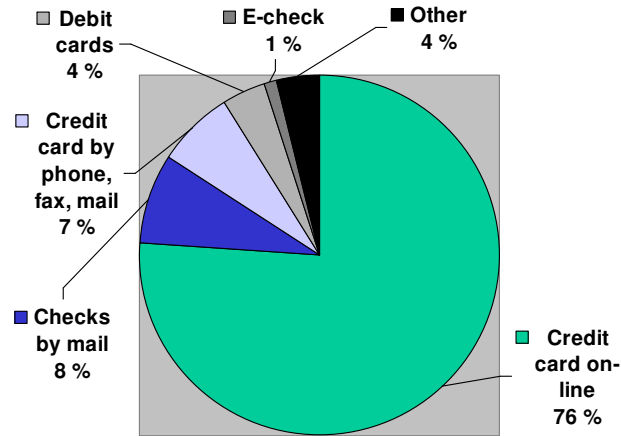
Revenue model	Examples	Revenue source
Advertising	Yahoo.com	Fees from advertizers in exchange for advertisements
Subscription	WSJ.com Sportsline.com	Fees from subscribers in exchange for access to content
Transactions	eBay.com E-Trade.com	Fees for enabling or executing a transaction
Sales	Amazon.com Sears.com	Sales of goods, information, or services
Affiliate	MyPoints.com	Fees for business referrals

Source: Laudon&Traver, 2003



# E-commerce

U.S. on-line payment market –merchants view



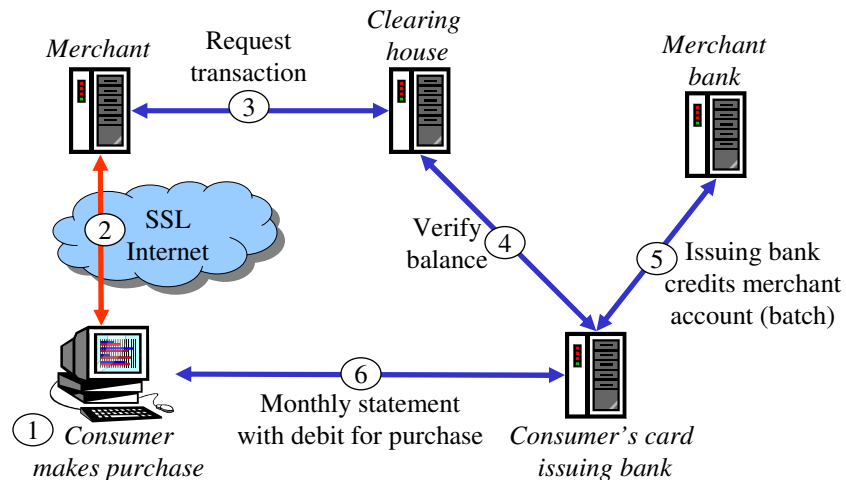
- VISA has over 50% marketshare of all Internet payments (ref. "Verified by VISA")

Source: Gartner Group, 2002



# E-commerce

On-line credit card process

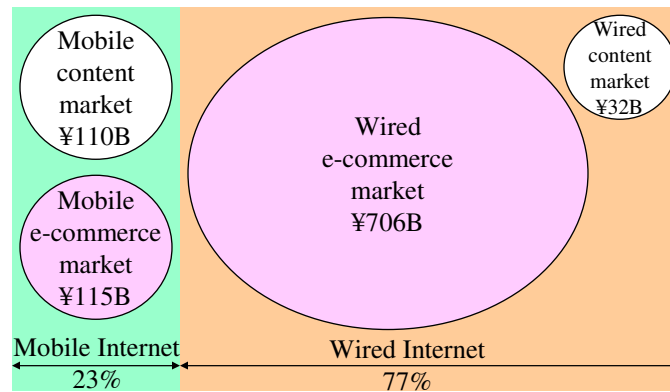


- Weakness in authentication (Secure Socket Layer  $\Rightarrow$  Secure Electronic Transaction)
- High cost (0.2-0.3€ per transaction  $\Rightarrow$  minimum purchase 10€)



# E-commerce vs. digital content

Japanese on-line market – wired vs. mobile in 2001



Source: ECOM, Natsuno, 2003



# Digital content

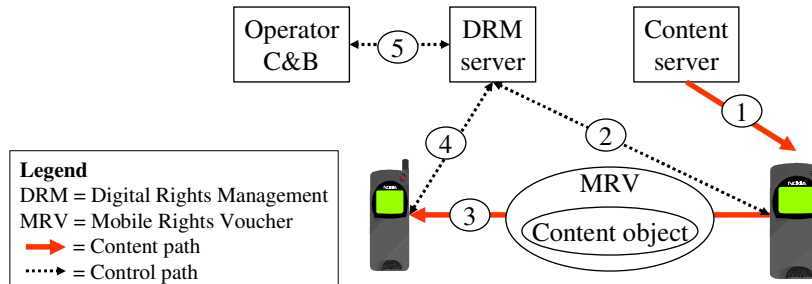
Digital wallet – core technology

- Digital wallet
  - authenticates the consumer digitally (certificates, SET, etc)
  - stores and transfers value
  - secures the payment from consumer to merchant
- Potential benefits
  - one-stop-shopping for transactions and bill presentment
  - user information pre-set  $\Rightarrow$  better usability (*single sign-on*)
  - real-time integration of the complete transaction chain
  - enables payments of < 5€ in Internet
- Two basic digital wallet approaches
  - client-based wallet for consumers (e.g. MasterCard Wallet)
  - server-based wallet for merchants (e.g. MSN Wallet/MS .NET)
    - consumers resist storing personal information in servers !
- Successful standard missing (e.g. Liberty Alliance, 3GPP)



# Digital content

## Mobile super-distribution



- Mass delivery of legal mobile content with low cost (e.g. peer-to-peer MMS)
- Micropayment mediation for a large number of retailers (content aggregation)
- Operator gets the rights clearing revenue from content retailers
- Usage rules in MRV control the usage of a content object (e.g. music)
- Mobile operator can integrate DRM with existing charging (pre/postpaid)



# Operator charging and billing

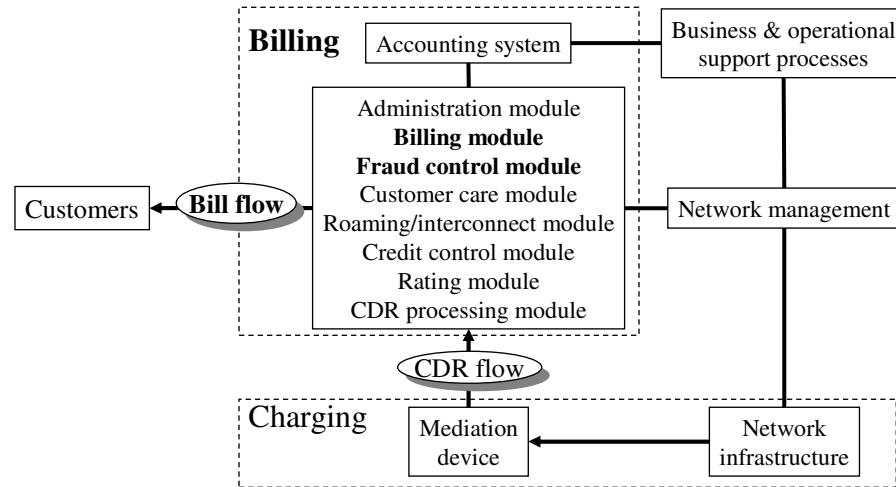
## Basic concepts

- *Charging*: a process where subscriber accounting information is retrieved for billing purposes
- *Billing*: generate and send a bill to subscriber based on certain tariffs
- Charging and billing are key components of *Business and Operations Support Systems* (BSS/OSS)
- Traditional circuit-switched charging is based on subscriber id and Call Detail Records (CDR) generated by network elements
- Packet-switched networks involve xDR, e.g. Internet Protocol Detail Records (IPDR) for new services such as IP telephony, public WLAN, digital cable, and content



# Operator charging and billing

Traditional system



# Operator charging and billing

Cost breakdown – example mid-size operator (3-5M subs)

OPEX, billing	Unit price	#	Total per year	Comments
Personnel	90000	100	9000000	
Post-processing	3000000	1	3000000	
Pre-paid/inter-operator			?	
Marketing	200000	1	200000	
<b>CAPEX/billing</b>				
Billing system	20000000	5	4000000	Divided over 5 years
Software upgrades	20000000	0,1	2000000	10% of purchase price
<b>OPEX, charging</b>				
Installation and maintenance	90000	10	900000	
<b>CAPEX, charging</b>				
Charging system	4000000	5	800000	20% of billing system
Software upgrades	4000000	0,1	400000	10% of purchase price
<b>CAPEX, total</b>			7200000	
<b>OPEX, total</b>			13100000	
<b>Total</b>			20300000	
<b>CAPEX % of total C&amp;B costs</b>			35 %	

Source: Gartner Group, Comptel, Swan 2003



# Operator charging and billing

## Cost analysis

- Total cost per bill (on paper) in traditional C&B can be several euros
- New features in mobile such as GPRS, prepaid, and multi-access roaming add C&B costs significantly (30% ?)
- Mobile operators fight the high C&B cost by offering their service to others or by outsourcing it
- Mobile C&B transaction cost can be reduced by
  - avoiding paper bills (electronic bills)
  - removing credit losses (post-paid  $\Rightarrow$  pre-paid/real-time)
  - eliminating history (digital credit  $\Rightarrow$  digital cash)
  - aggregating for settlement (digital wallet)
  - automating the top-up process (digital wallet)



# Operator charging and billing

## Mobile pre-paid process

