



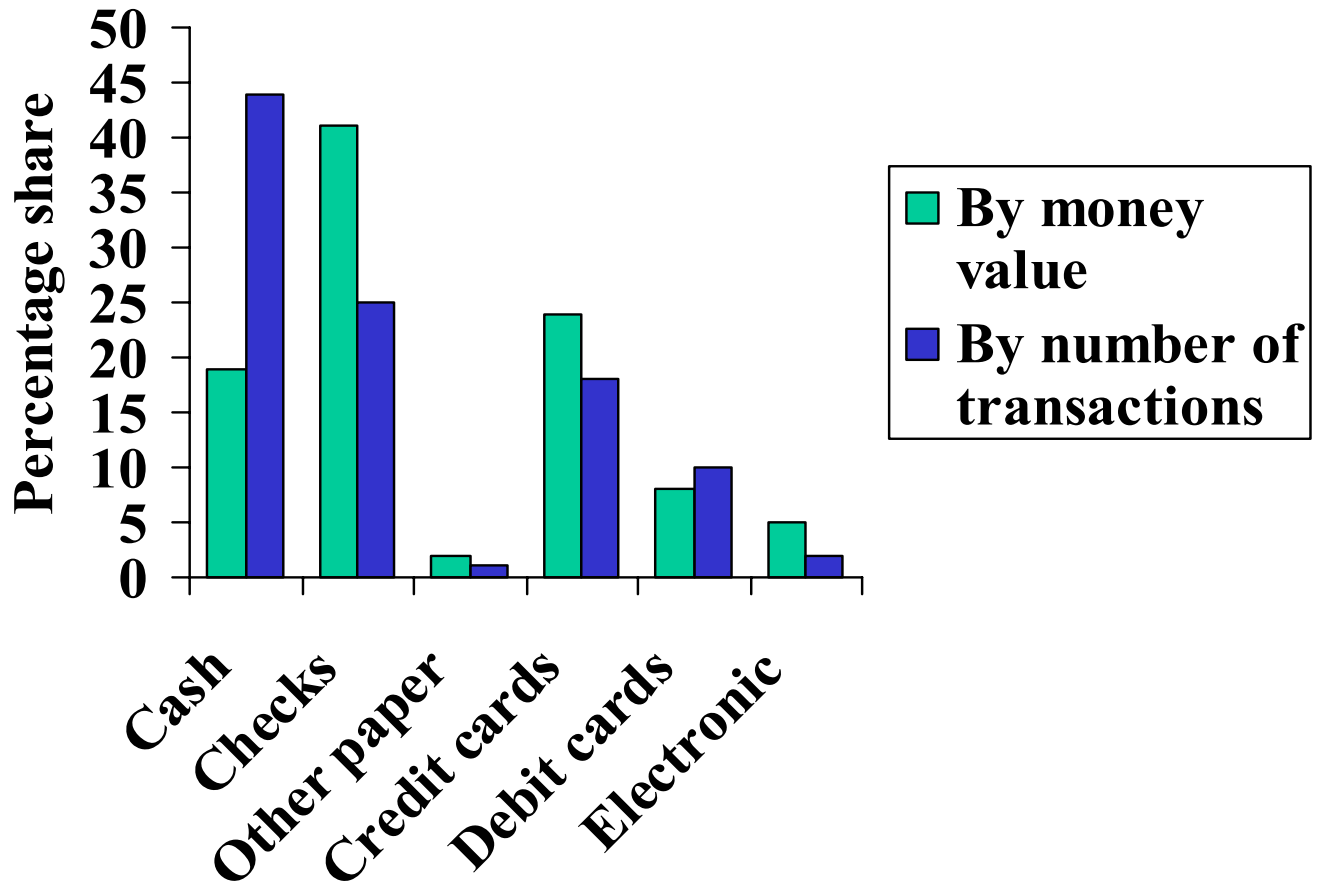
Charging and billing (C&B)

S-38.041 Networking Business



Traditional payment systems

US market - Value and volume of payments



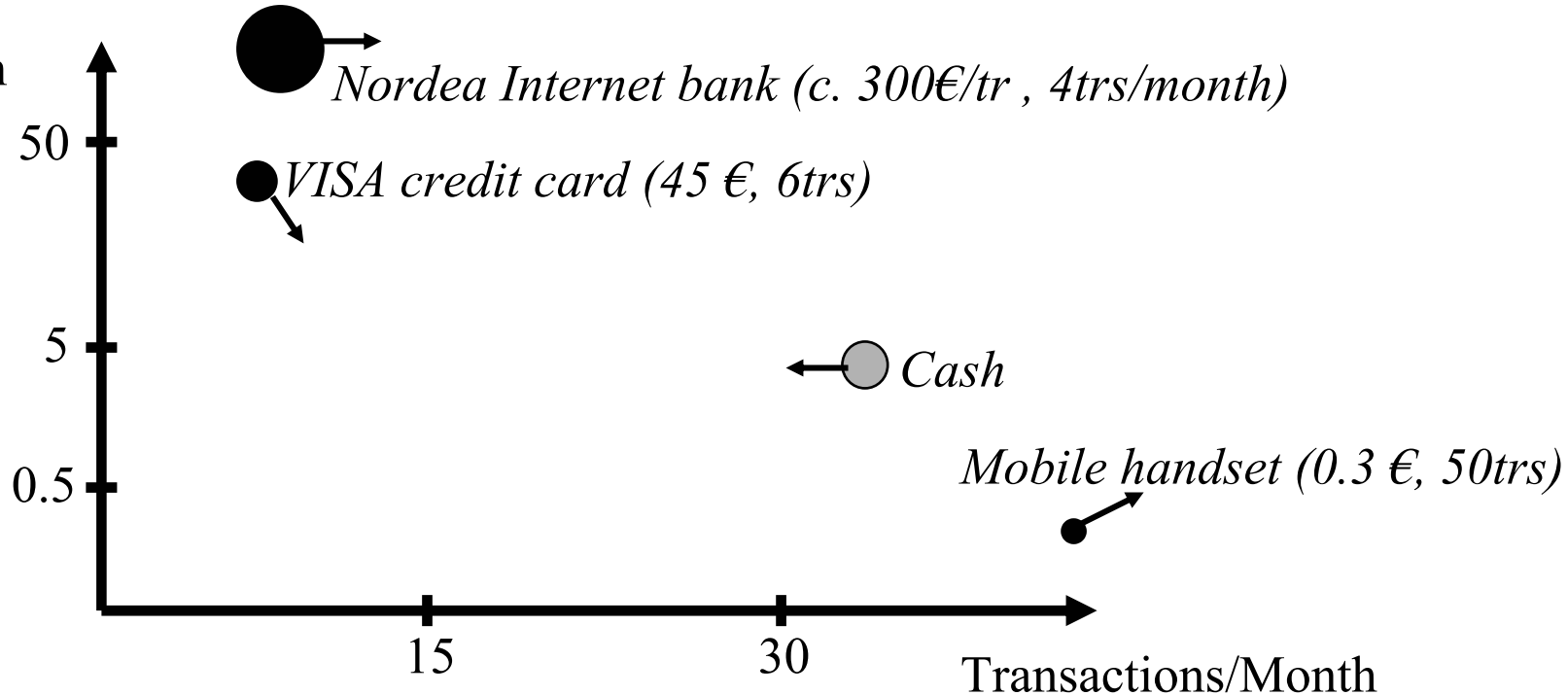
Source: U.S.Census Bureau, 2002



Traditional payment systems

Finland

Value(€)/
Transaction



- 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

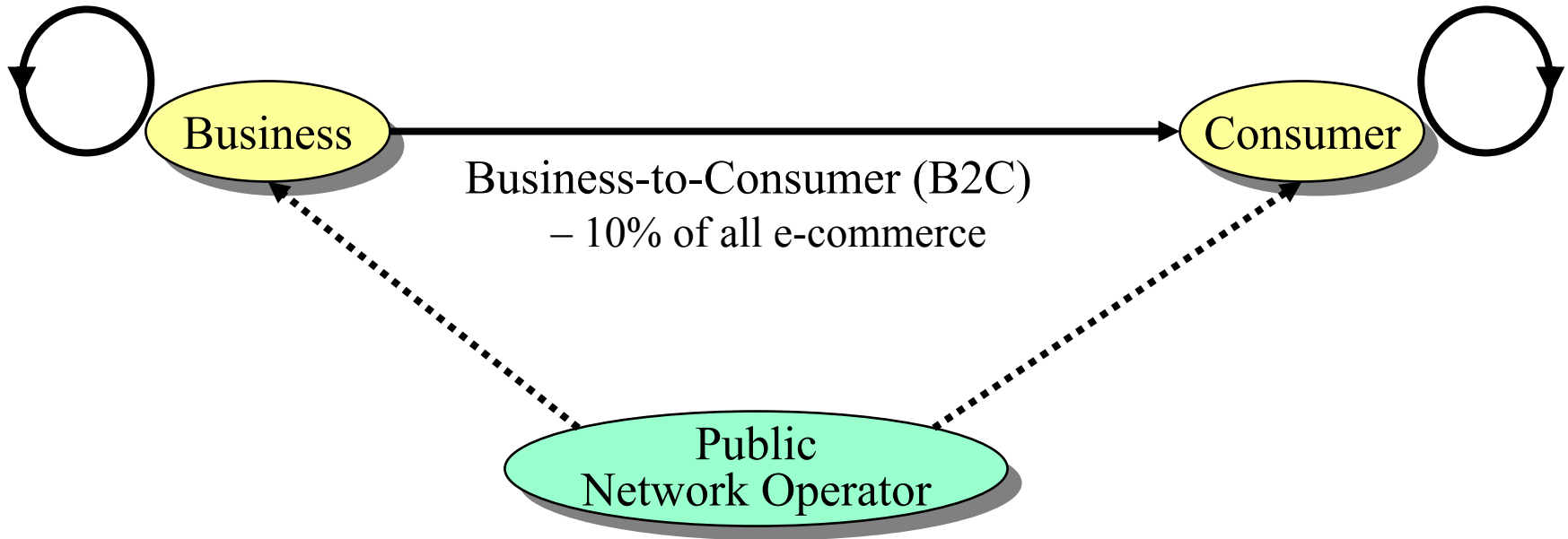
Basic business sectors

Business-to-Business (B2B)

– 90% of all e-commerce

Consumer-to-Consumer (C2C)

– 1% of all e-commerce



Business-to-Consumer (B2C)

– 10% of all e-commerce

Role of network operators

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



E-commerce

Revenue models

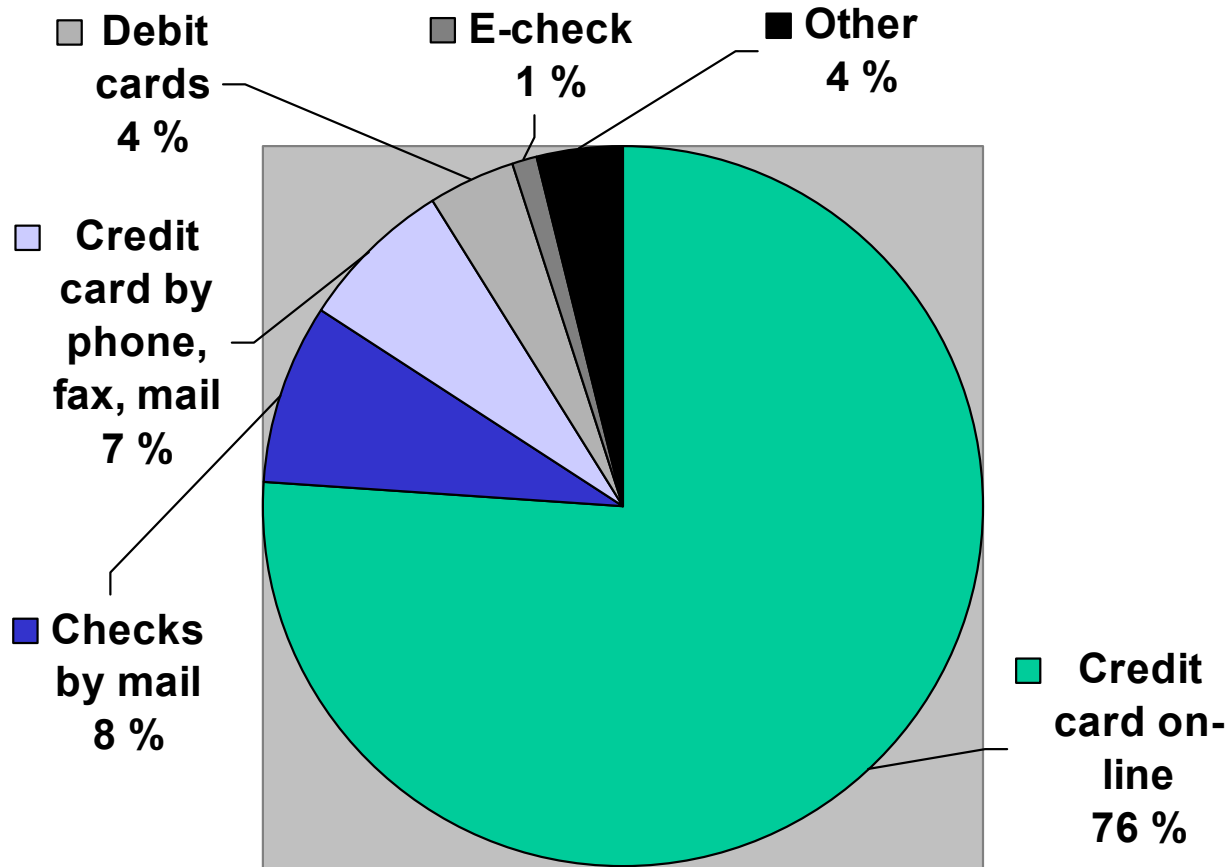
Revenue model	Examples	Revenue source
Advertising	Yahoo.com	Fees from advertizers in exchange for advertisements
Subscription	WSJ.com Sportsline.com	Fees from subscribers in exchange for access to content
Transactions	eBay.com E-Trade.com	Fees for enabling or executing a transaction
Sales	Amazon.com 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



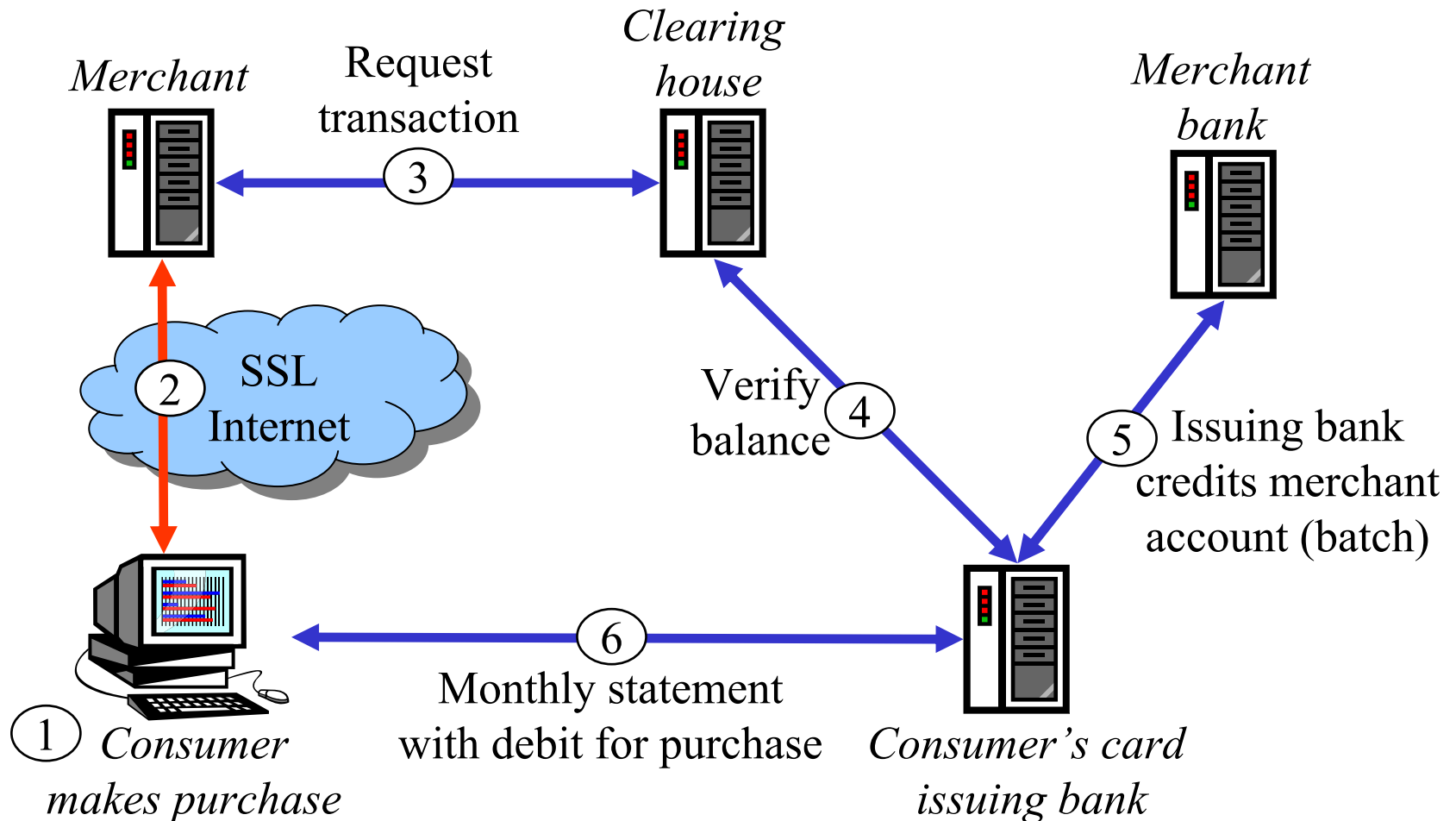
- VISA has over 50% marketshare of all Internet payments (ref. "Verified by VISA")

Source: Gartner Group, 2002



E-commerce

On-line credit card process

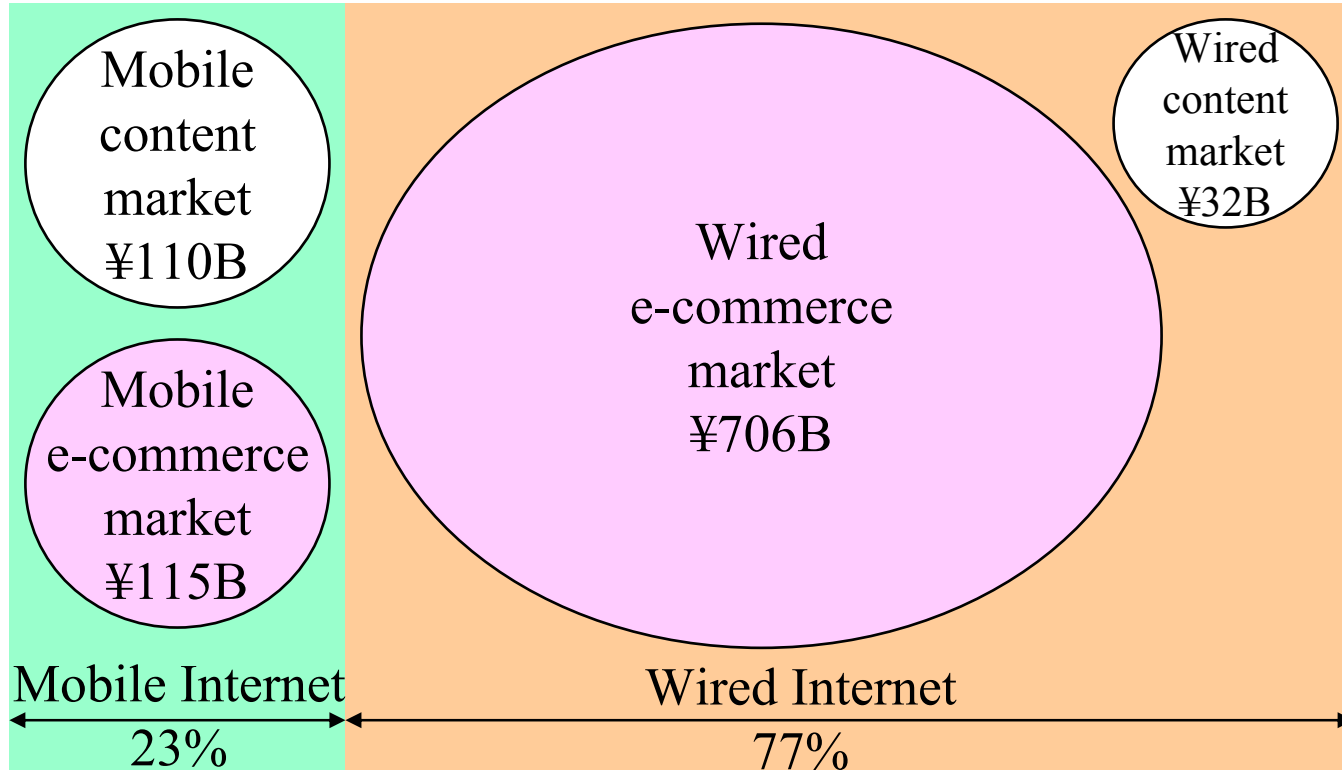


- Weakness in authentication (Secure Socket Layer \Rightarrow Secure Electronic Transaction)
- High cost (0.2-0.3€ per transaction \Rightarrow minimum purchase 10€)



E-commerce vs. digital content

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



Source: ECOM, Natsuno, 2003



Digital content

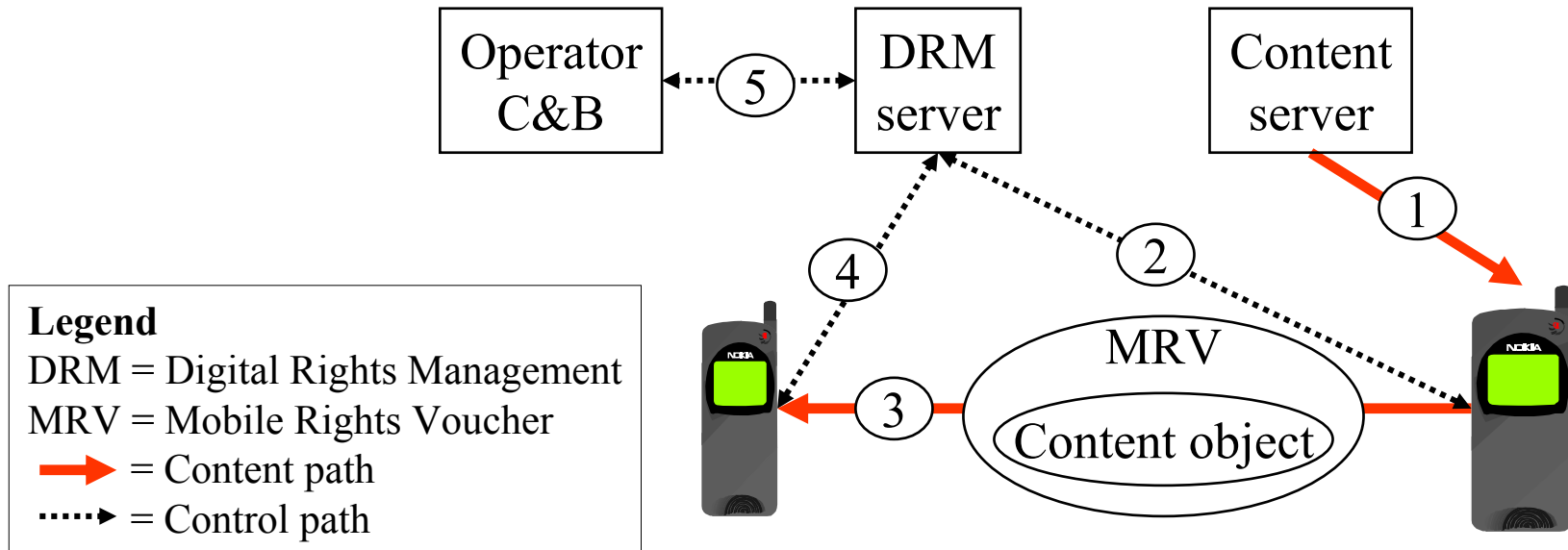
Digital wallet – core technology

- 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 $< 5\text{€}$ 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

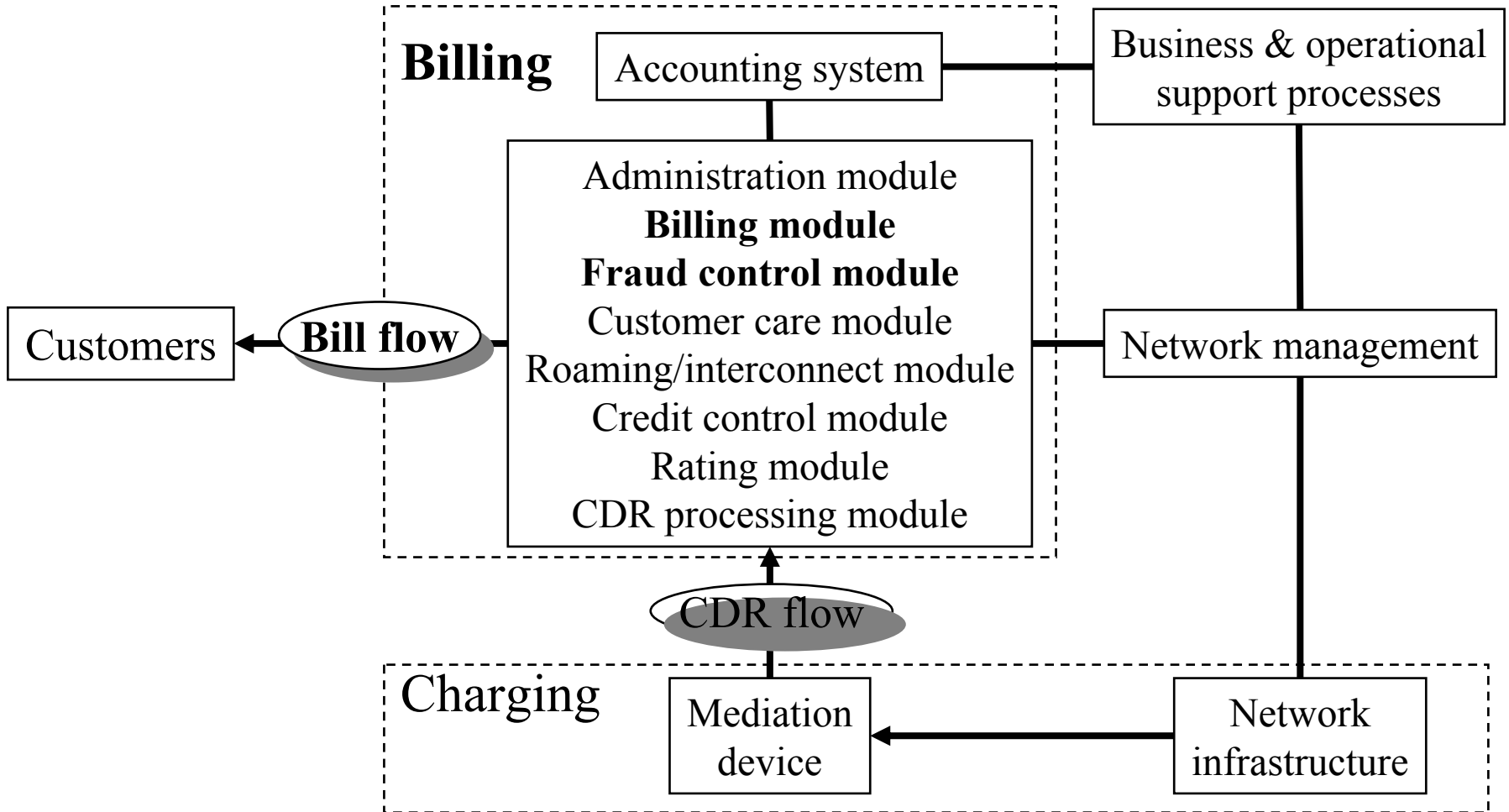
Basic concepts

- *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	
CAPEX/billing				
Billing system	20000000	5	4000000	Divided over 5 years
Software upgrades	20000000	0,1	2000000	10% of purchase price
OPEX, charging				
Installation and maintenance	90000	10	900000	
CAPEX, charging				
Charging system	4000000	5	800000	20% of billing system
Software upgrades	4000000	0,1	400000	10% of purchase price
CAPEX, total			7200000	
OPEX, total			13100000	
Total			20300000	
CAPEX % of total C&B costs			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

