



Micropayment Architectures

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Agenda



Micropayment Architectures

- Market expectations
- Emerging applications
- Micropayment architectures
 - Generic model
 - Typical variations
 - Technical considerations
 - Sample transaction flows
- Business models
- Vendors and systems
- Current issues

What is a Micropayment?



Definitions ...

- A micropayment is any payment under \$10 that is used primarily to buy and sell digital goods over the Web
- A micropayment system is any payment system that handles transactions as small as 1¢
- A micropayment represents the transfer of value from one entity to another in arbitrarily small amounts, where transfer revenue is greater than transfer cost (W3C Micropayments WG)
- Micropayments \cong Digital Cash \cong eMoney
- Micropayments \neq Digital Cash \neq eMoney

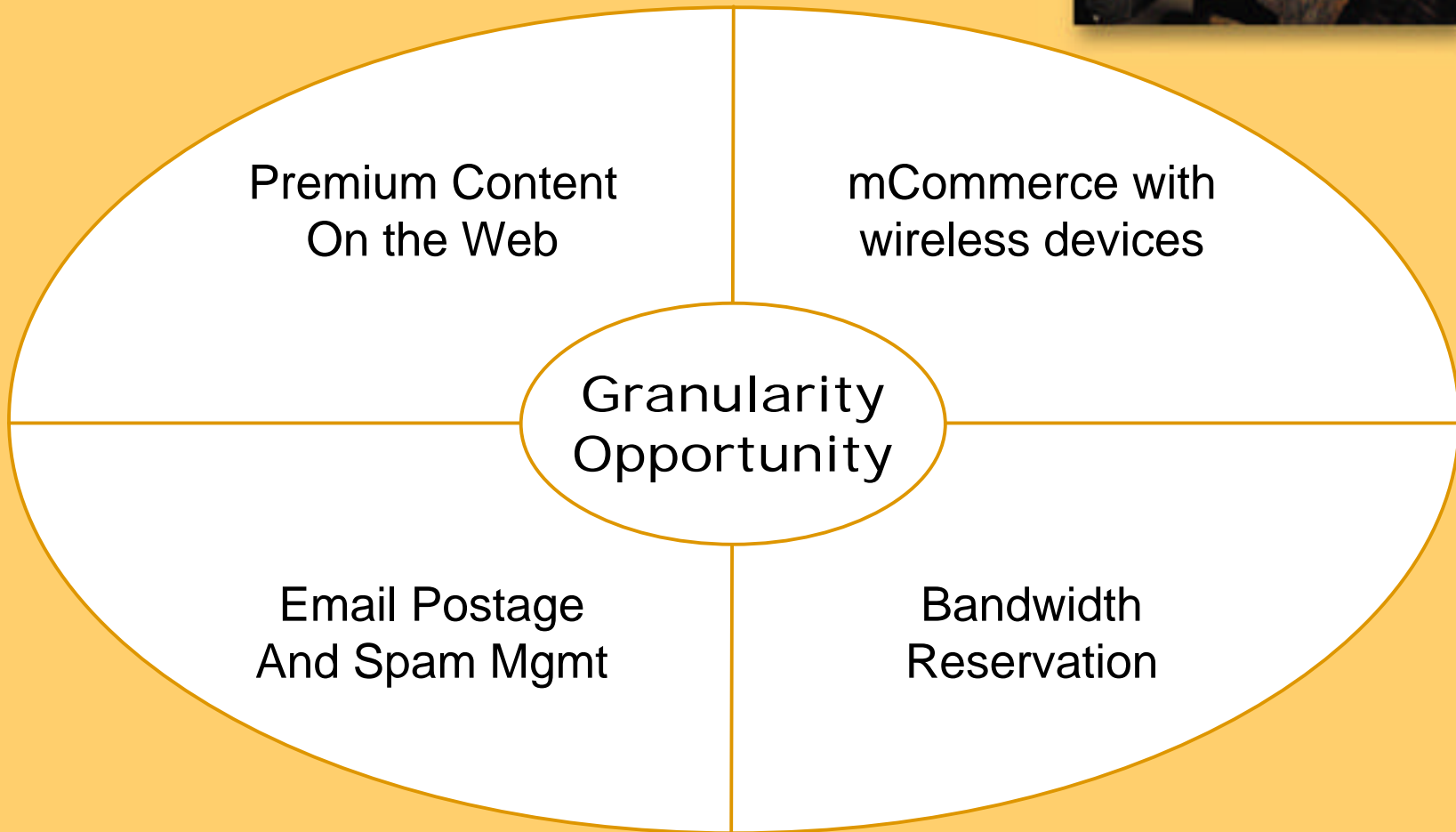
Market Expectations



Who needs micropayments?

- Sellers?
 - Yes, if they can sell new things at lower pricing points
 - Yes, if they can simplify the purchase process
 - Yes, if they can lower their cost of payments
 - Yes, if they can get quick payment finality
- Buyers?
 - Maybe, if it saves them money
 - Maybe, if they can do new things
- Financial Institutions?
 - Only if they can derive incremental revenue
 - Only if there is an existing market of buyers and sellers

Application Domains



Content Business Models

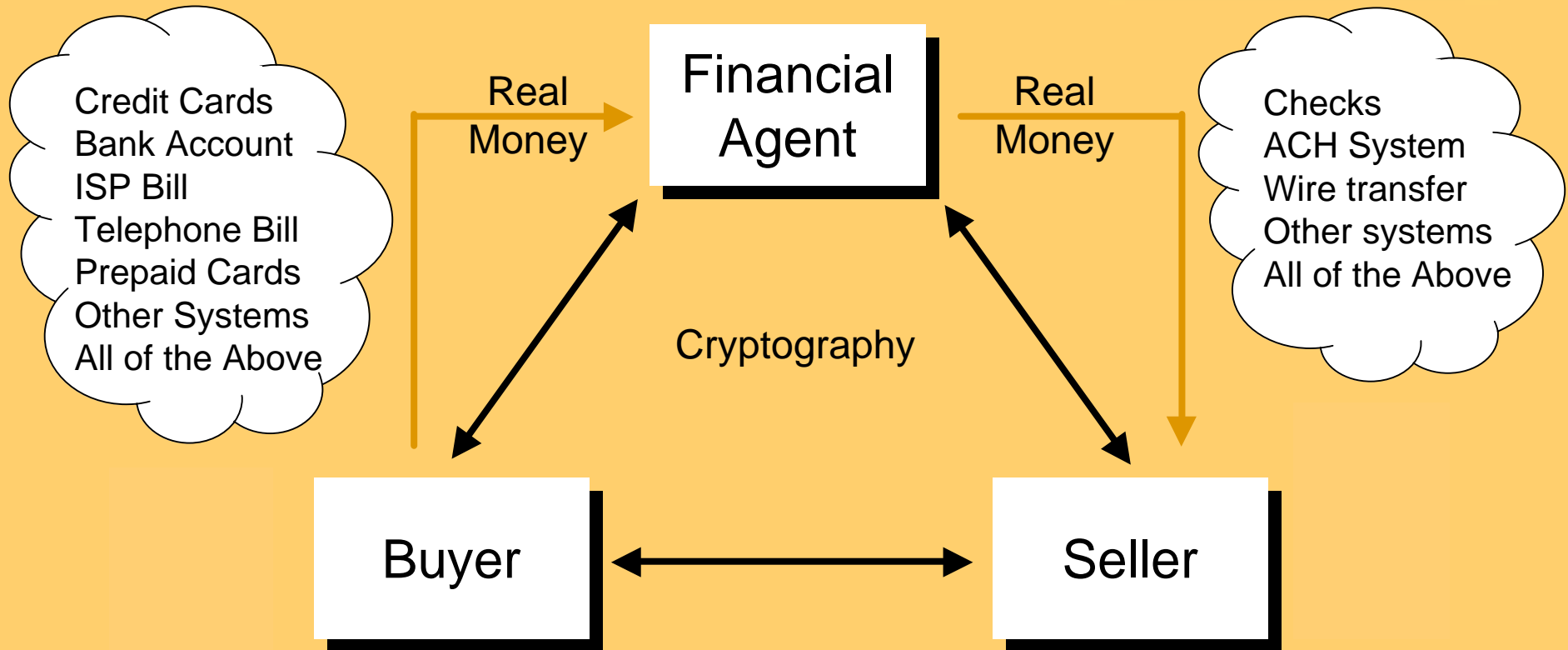


Micropayment applications ...

- Pay-per-click
- Flat-rate subscriptions
- Usage-based metering
- Preferred service
- Advertising filtering
- Loyalty points
- Advertising rebates
- Donations & tips
- Couponing
- Tiered pricing

Unified Model is Starting to Emerge

Generic Architecture



Two Architectural Models



Notational Model

- Value held centrally
- Buyer directs value to be transferred to seller
- Mirrors credit / debit accounting
- Shared purchase history
- Accounts are “protected”
- No client software (*)

Token Model

- Value held locally
- Buyer hands value to seller with a token
- Mirrors stamps, tickets, subway tokens
- Private purchase history
- Tokens can be lost
- Client software required (*)

(*) Except for exceptions

Four Fundamental Variations



Notational Aggregation

Billing information on file, all purchases aggregated against a single end-of-period transaction.

Notational Prepaid

Prepaid value held in account, all purchases are debited against prepaid balance.

Prepaid Tokens

Prepaid value held in tokens, which are spent on purchases. Sometimes there is “change”.

Proof of Credit (Hybrid)

Billing information on file, a token (as proof of credit) is used to run up a tab with each merchant.

Technical Considerations



Notational Systems

- Buyer authentication
- Seller authentication
- Account protection

Token Systems

- Forgery & Counterfeiting
- Token theft & content theft
- Double Spending

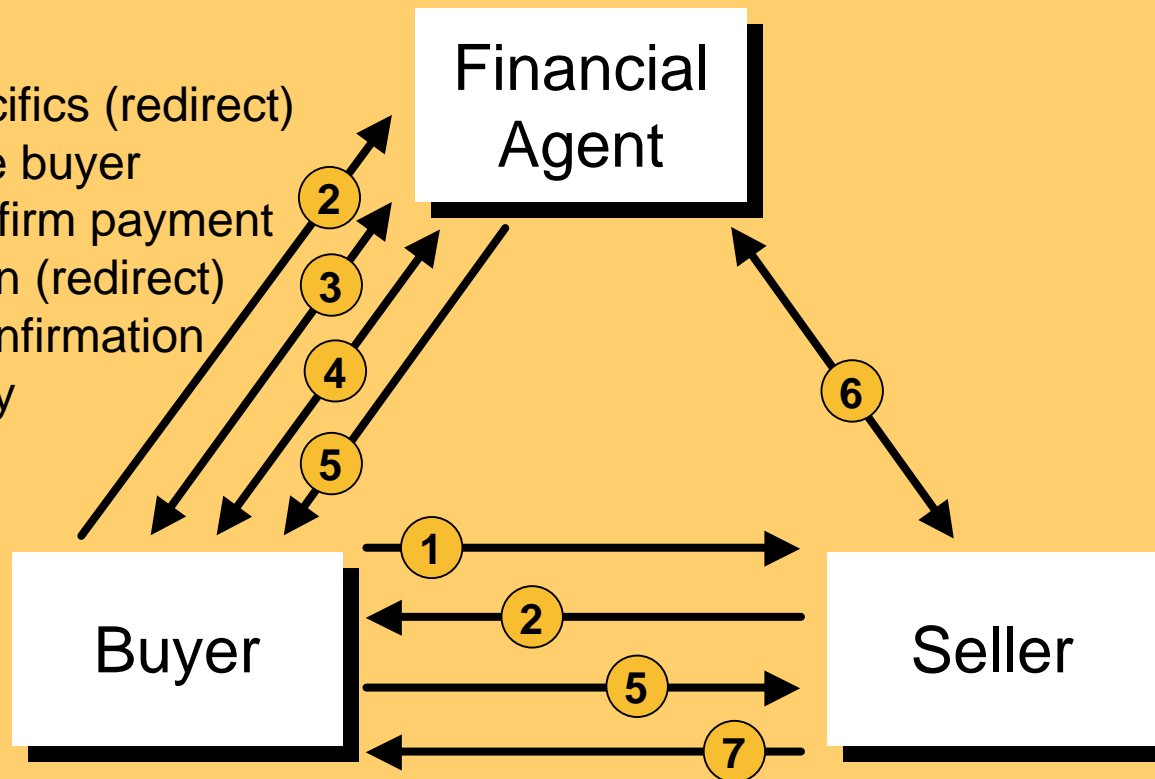
All Micropayments Systems

- Website Integration
 - Document tree integration
 - Pricing markup technique
 - URL protection
- Problem Resolution
 - Replays
 - Refunds
 - Credits

Notational Architecture #1



- 1) Buy a URL
- 2) Invoice specifics (redirect)
- 3) Authenticate buyer
- 4) Present/confirm payment
- 5) Authorization (redirect)
- 6) Payment confirmation
- 7) URL delivery

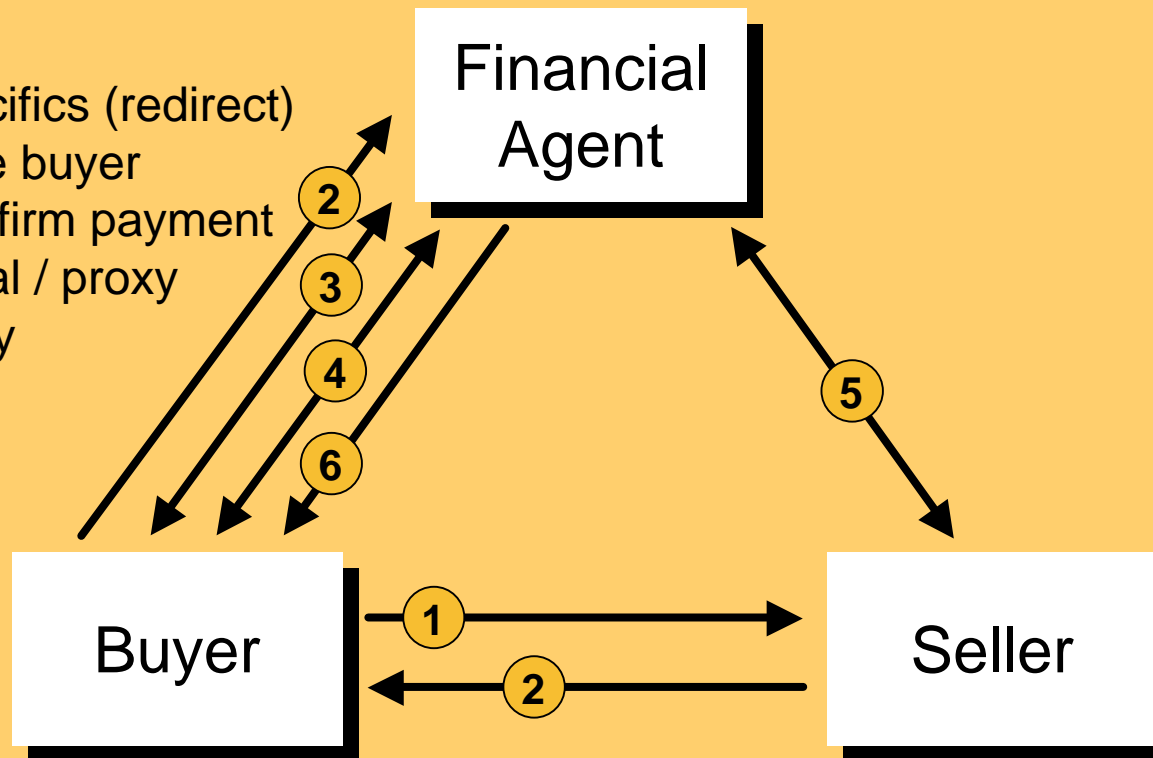


Buyer already has billing relationship with financial agent, now makes a purchase

Notational Architecture #2



- 1) Buy a URL
- 2) Invoice specifics (redirect)
- 3) Authenticate buyer
- 4) Present/confirm payment
- 5) URL retrieval / proxy
- 6) URL delivery

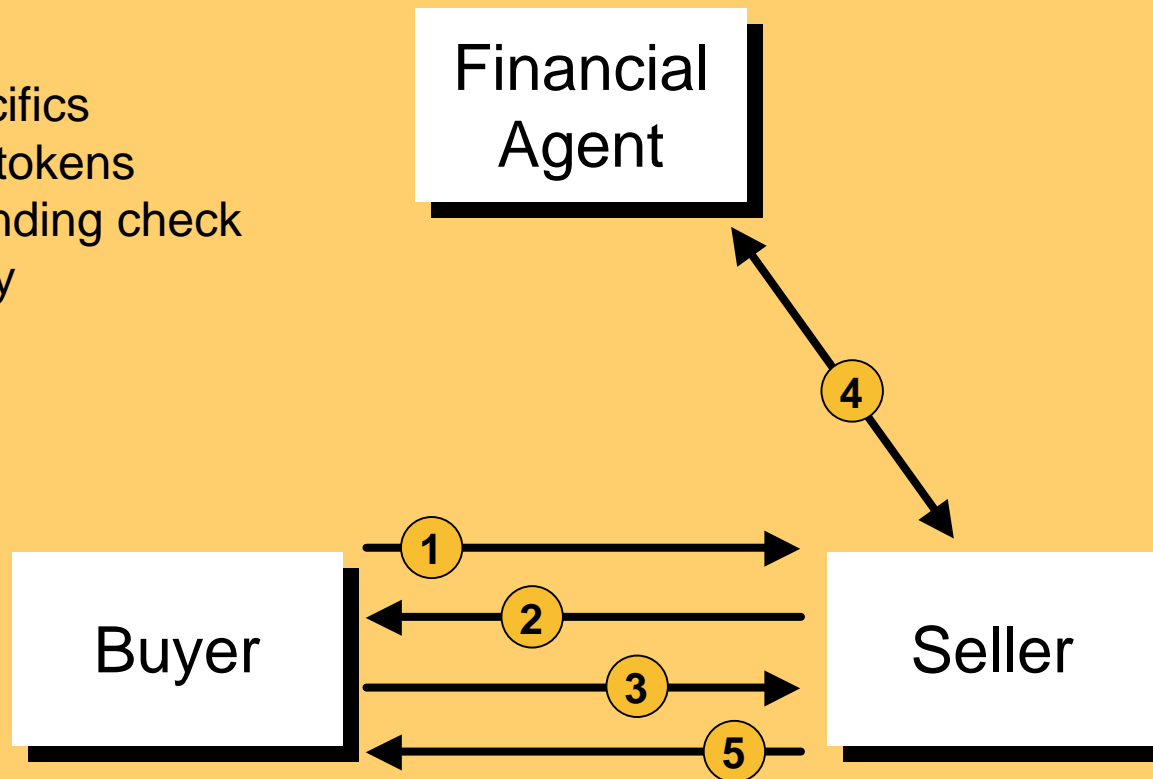


Same as notational architecture #1, but financial agent retrieves content for buyer

Token Architecture #1

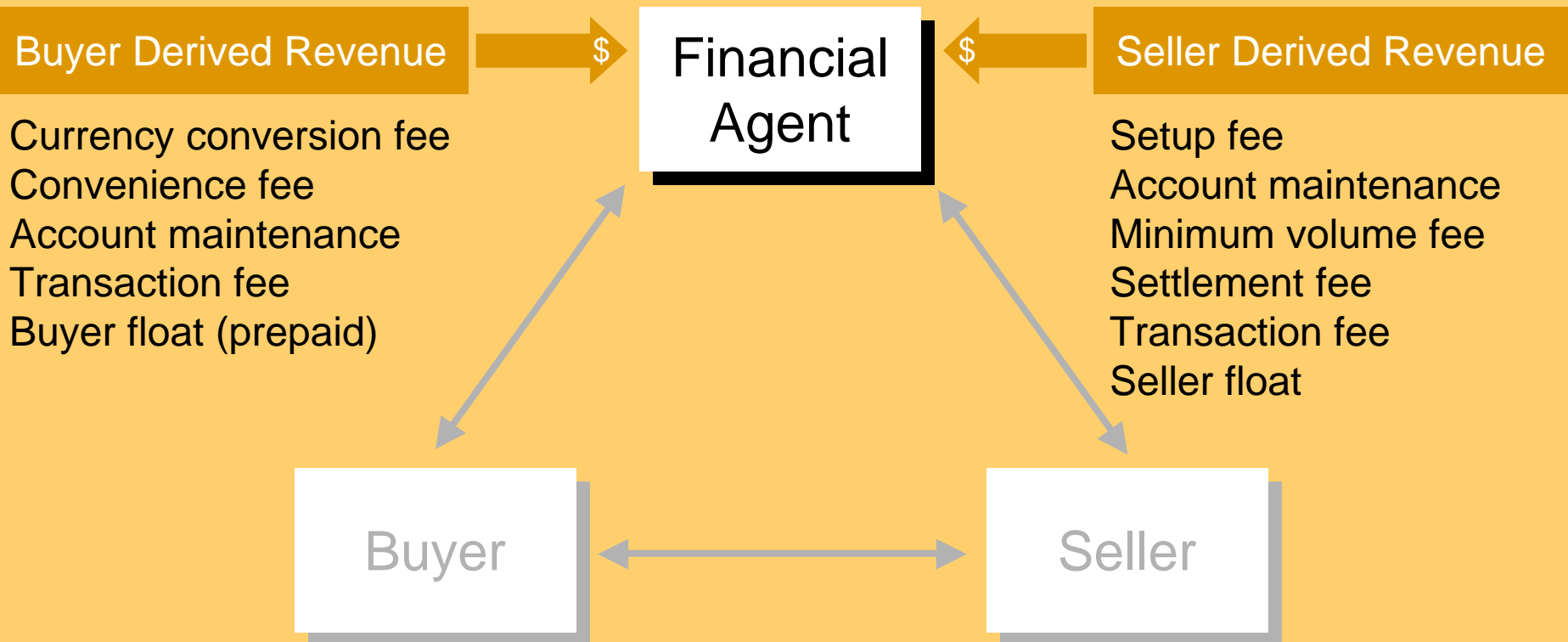


- 1) Buy a URL
- 2) Invoice specifics
- 3) Payment in tokens
- 4) Double-spending check
- 5) URL delivery



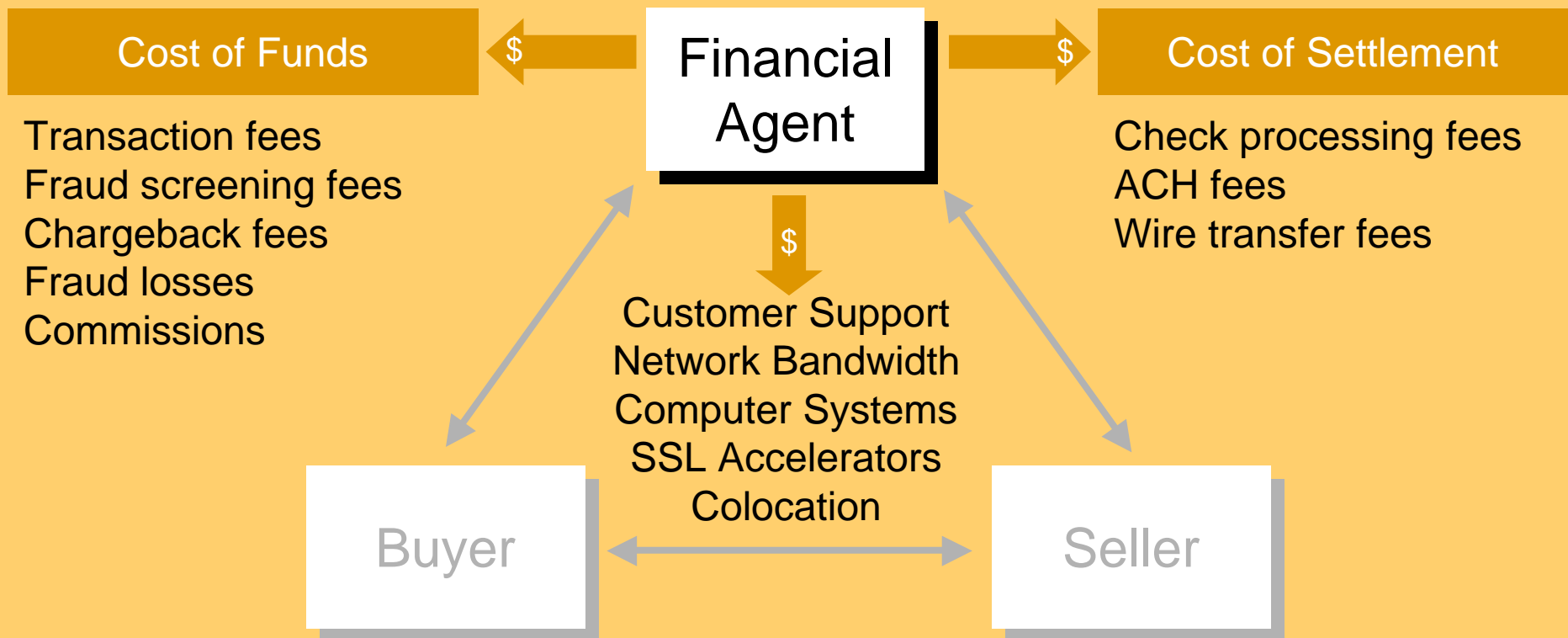
Buyer already has purchased tokens from financial agent, now makes a purchase

Business Model: Revenue



All determined by the financial agents terms & conditions
Can also license customer lists, freeze assets, & generate advertising revenue

Business Model: Cost



Financial agent has fixed cost per user and variable transaction cost
Must also absorb losses from fraudulent merchants & buyer/seller disputes

Vendors & Systems (Sample)



CentMeter

ClickShare

e-Cash

e-gold (1)

eCharge

Enition

iBUC

InternetCash (2)

Internet Dollar

iPIN

Jalda

Magex

MagnaCash

MilliCent

Mojo Nation

Mondex (3)

NextGenPay

Online Toll

PayPal (4)

Qpass

Trivnet

(1) Plus all other gold-based currencies (GBCs)

(2) Plus all other prepaid card providers

(3) Plus all other smart card-based payment systems

(4) Plus all other person-to-person payment service providers

Current Micropayment Issues



What the industry is talking about ...

- Well-known websites that now charge for content
- How to establish a critical mass of sellers *and* buyers
- Role of *Open Source* in micropayments
- Interplay of micropayments, privacy, anonymity, and copyright
- Possible opportunities to marry micropayments with P2P
- Lock up of key intellectual property
- Standardization of a common pricing markup language
- Evolution to a common merchant payment toolkit
- Latest PayPal statistics 😊

Summary



- Micropayments are still over the horizon, but clearly coming
- Growing recognition the Internet needs new business models
- Lots of people are involved with lots of ideas
- The community welcomes all participants!

The NuVantage Group



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