

The Atomic Market

Enabling Component-Based Agent Marketplaces

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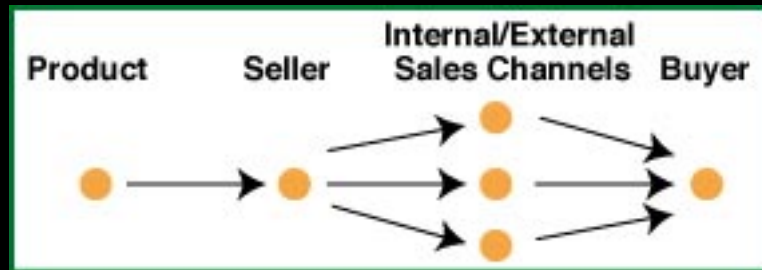


How can we define a traditional market?

- a place where compatible traders meet
“The New York Stock Exchange”

and

- enforcer of a market model
“Open outcry, \$0.01 price increments,
100-share lots, ...”



What defines a traditional e-market?

- **promotion of a market model**
“Group buying at mercata.com”

and

- **no intermediaries**

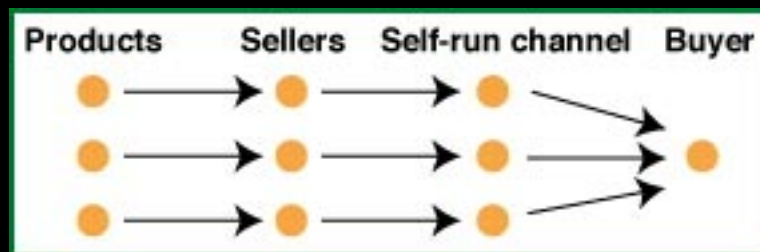
Market operating costs are borne by the channel-maker

and

- **discovery that markets are expensive to create and run**



MERCATA.COM

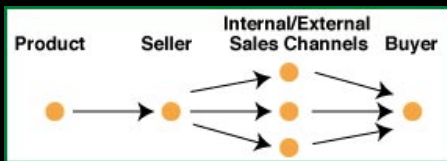


What's different about an Atomic Market?

Decentralized

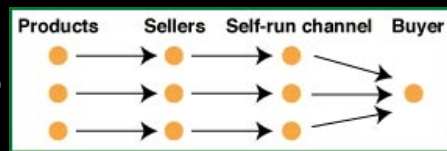
Component-based

Open-ended



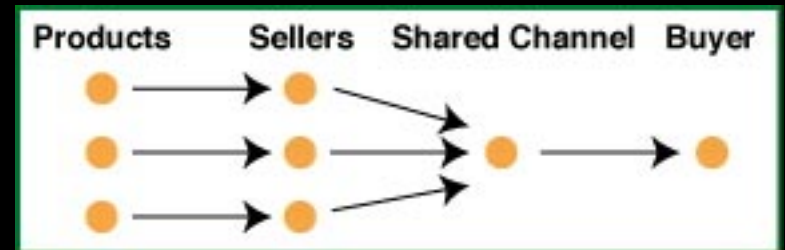
Traditional model

+



1st wave e-commerce

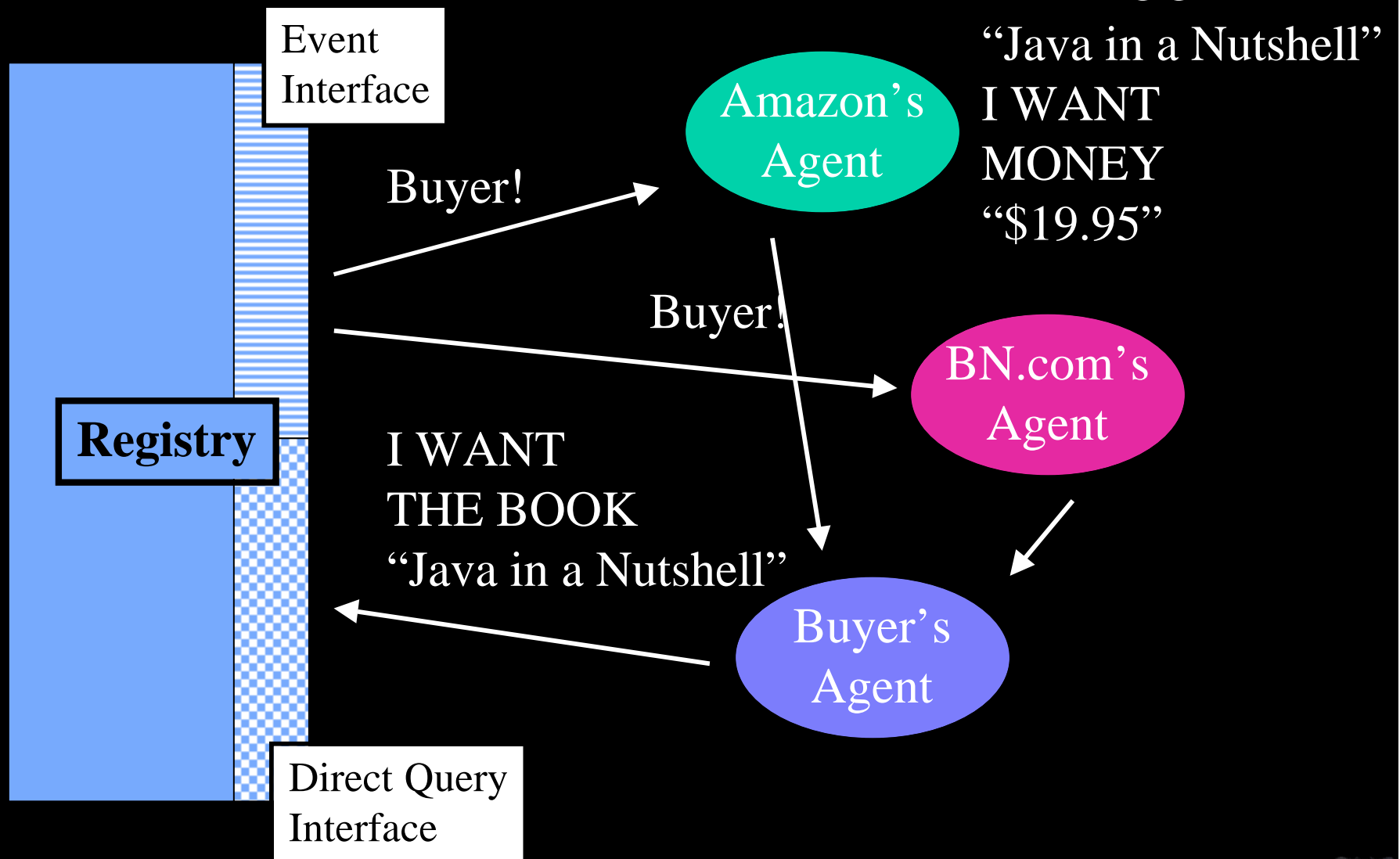
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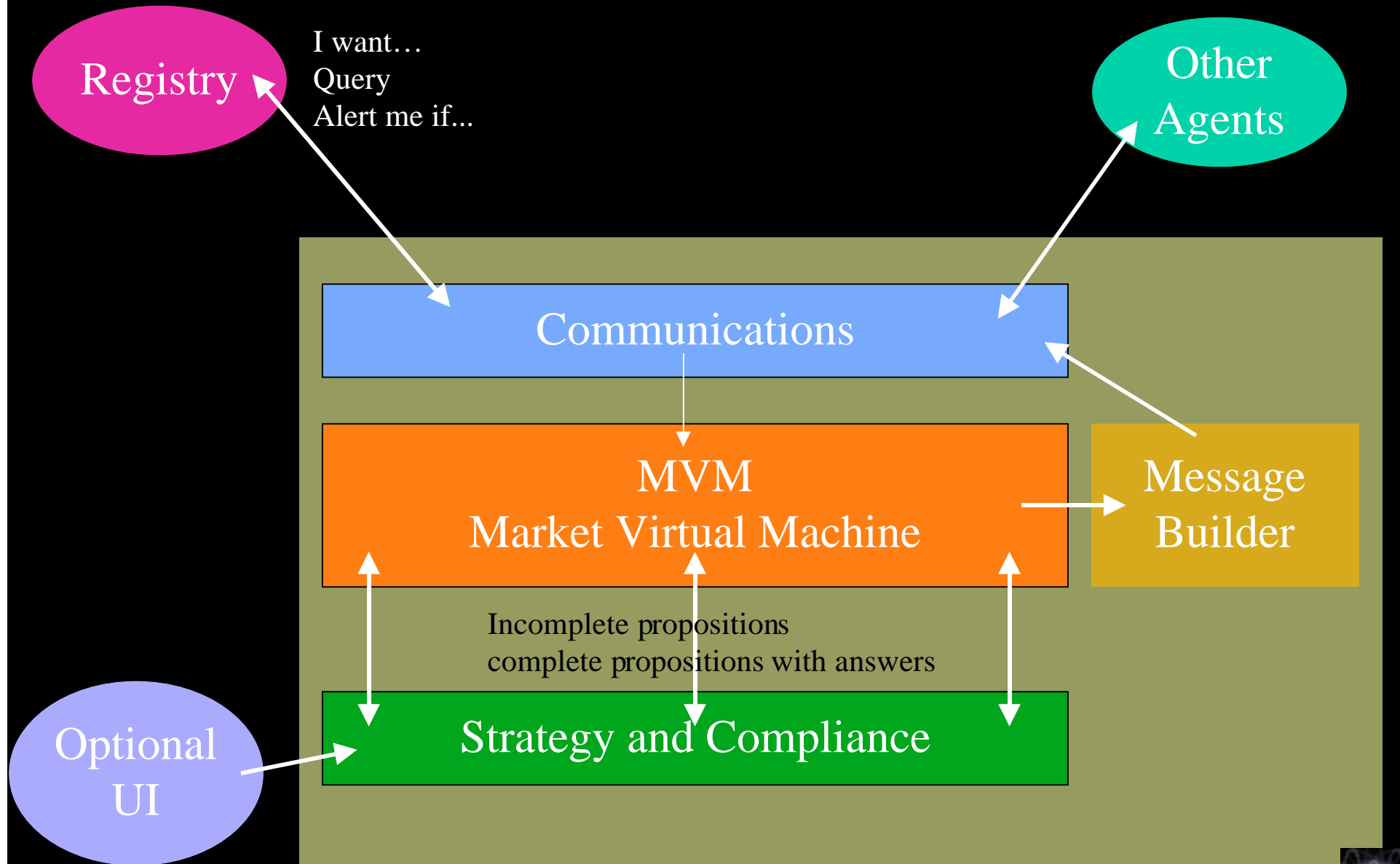
Atomic Market model



Conceptual model



Conceptual model: inside an agent



What's different about an Atomic Market?

DECENTRALIZED

- **No 'market authority'**

 - Only a central matchmaking directory: no influence over trade

 - Minimal central market expense

 - No market-serving policies

 - ... and no protection

- **Direct agent interaction**

 - Agent traders tailor every deal

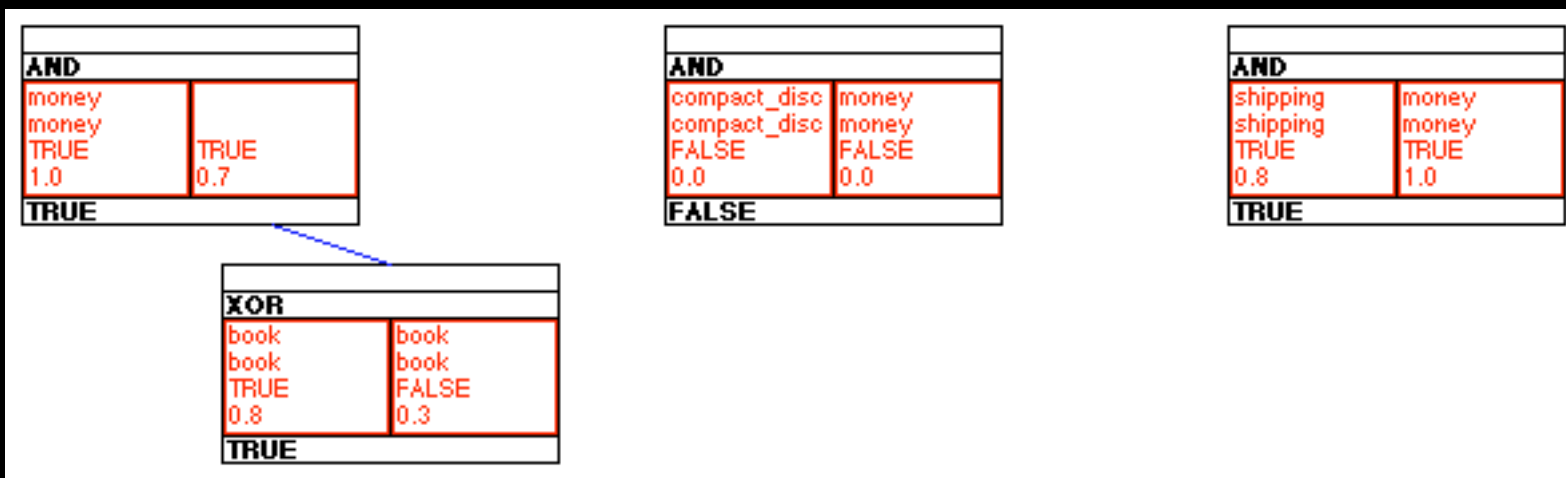
 - Intermediaries always supported but optional

 - Traders may engage authorities to mitigate risk



What's different about an Atomic Market?

COMPONENT-BASED TRANSACTIONS



What's different about an Atomic Market?

COMPONENT-BASED TRANSACTIONS

- **Items and terms are component atoms**

```
cd.title="Play"; cd.quantity=1; cd.artist="Moby";  
money.description="USD"; money.quantity="12.97"
```

- **Component atoms are the smallest units that support negotiation**

Atoms represent separately-negotiable elements

Joined, they form propositions that define the transaction

- **Agents exchange logical propositions built of atoms:**

("buy item" AND "offer money" AND "deliver <= 10 days")

- **Transactions may involve more than two parties**

"A DVD₁ player₂ shipped₃, insured₃, paid by MasterCard₄"



What's different about an Atomic Market?

OPEN-ENDED

- **We cannot predict how the transaction will conclude**

Individual strategies may be deterministic

but market outcomes are not

A transaction concludes when all participants are satisfied

- **Traders may add their own requirements**

“I want a DVD player”

answer:

“I want money”

“I am offering insurance”

answer:

“I want insurance and proof of your insurance license”



Some complex but routine transactions

Forward contracts:



3 tomatoes per
week, for a year



Not 156 tomorrow!

Bundles – this item *and* that item

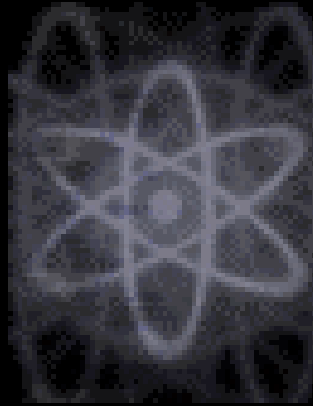
Contingent orders – these items *if* ...



Benefits of an Atomic Market

- Precise specification of needs, offers
- Negotiable rules of engagement
- Cross-model transactions
- Spontaneous markets form around needs / offers
- Specialist agents may emerge
aggregation, referrals, market data
- Detailed negotiations supported for “small” deals
- No “B2C” or “B2B”
transactions occur between equals
an offer to sell is the complement of an offer to buy





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