The Atomic Market
Enabling Component-Based Agent Marketplaces

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Software Agents Group
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
What’s different about an Atomic Market?

Decentralized
Component-based
Open-ended

Traditional model  +  1st wave e-commerce  =  Atomic Market model
Conceptual model

I HAVE THE BOOK “Java in a Nutshell”
I WANT MONEY “$19.95”

Registro

Event Interface

Amazon’s Agent

BN.com’s Agent

Buyer’s Agent

Direct Query Interface

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Conceptual model: inside an agent

Registry
- I want...
- Query
- Alert me if...

Other Agents

Communications

MVM
Market Virtual Machine
- Incomplete propositions
- Complete propositions with answers

Message Builder

Strategy and Compliance

Optional UI

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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

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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 DVD player shipped, insured, paid by MasterCard”

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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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