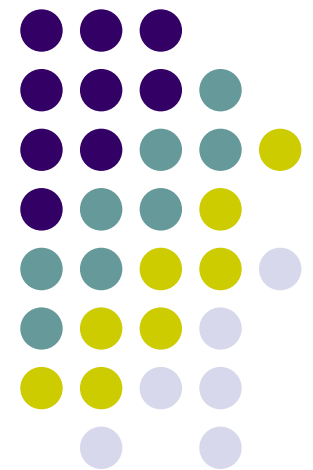


A Technique and Markup Language for Business Process Automation

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The University of Melbourne,
Australia

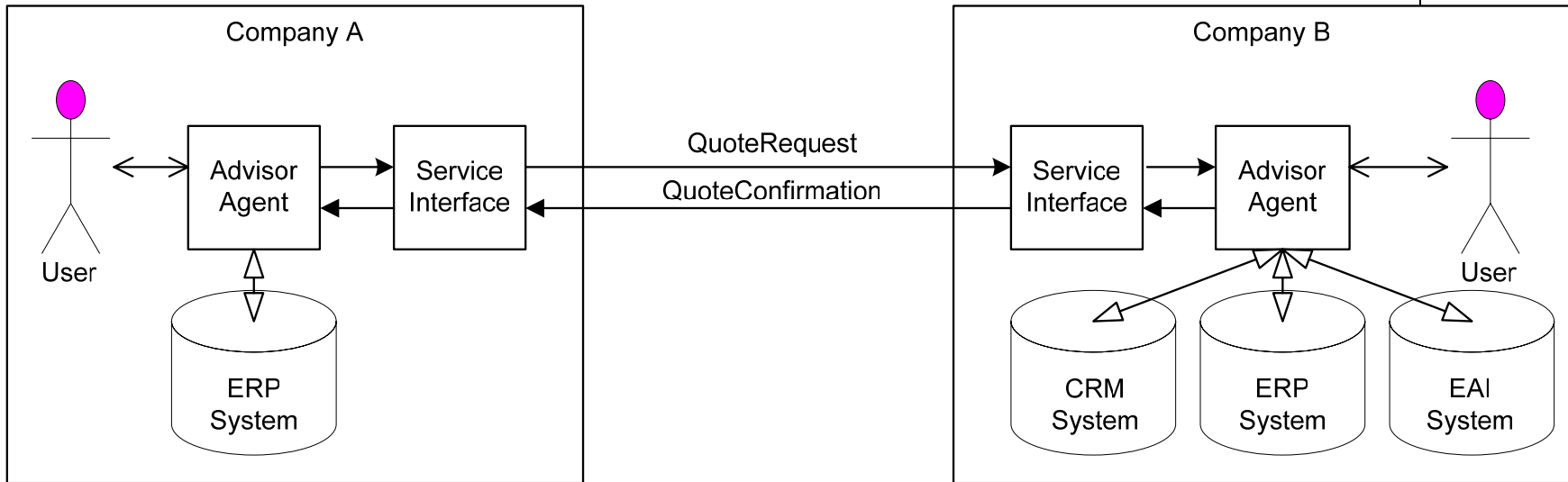




Motivation

- Decision-making in business processes is not automated or in many cases even modelled.
- Model Driven Architecture (MDA) is gaining momentum.
- Agent technology is there ready to be used for business process automation.

The vision

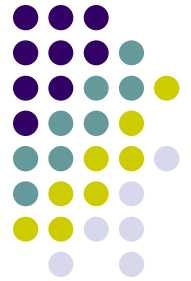




How to achieve the vision?

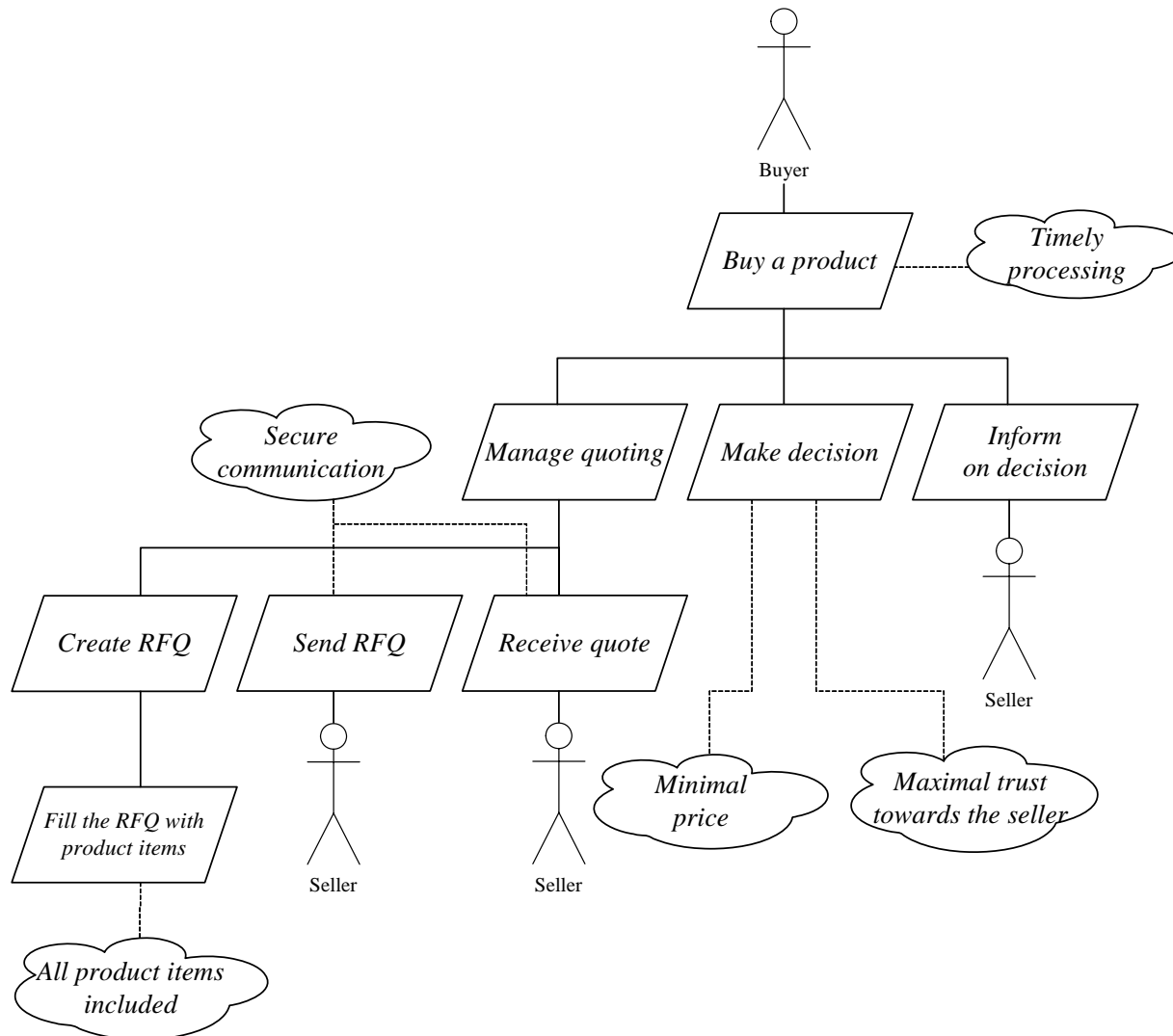
- We do not need complicated ontologies.
- We need easy-to-grasp successive models leading to fast implementation.

How to achieve agility within MDA?



| Perspective | Models |
|-----------------------------------------------------------|----------------------------------------------|
| Computation-Independent Modelling | Goal Models + Knowledge Models |
| Platform-Independent Computational Design | External AOR Models |
| Platform-Specific Computational Design and Implementation | Internal AOR models (in the markup language) |

The Goal Model

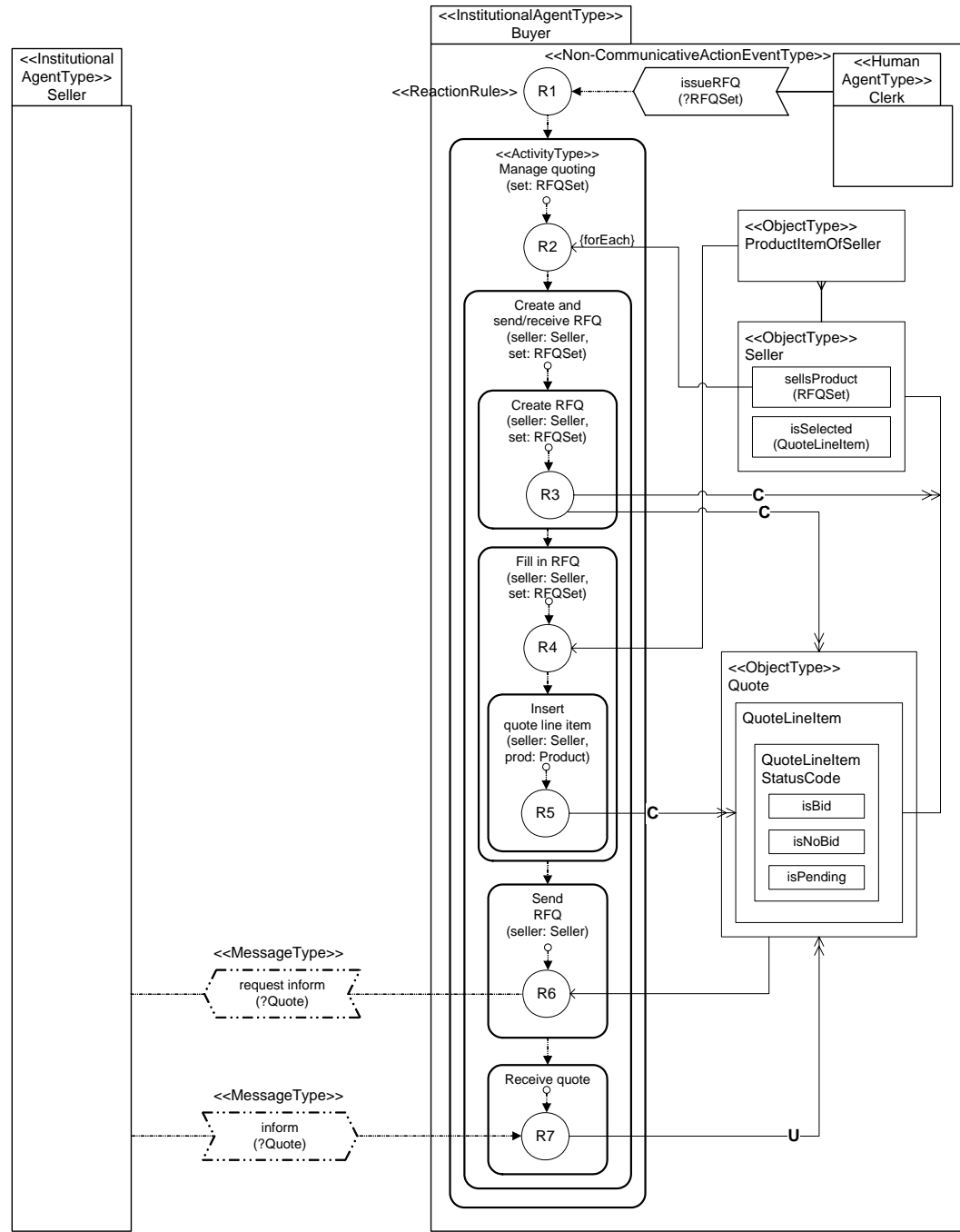
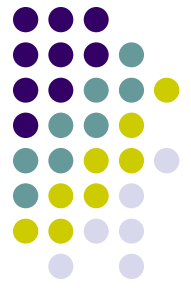




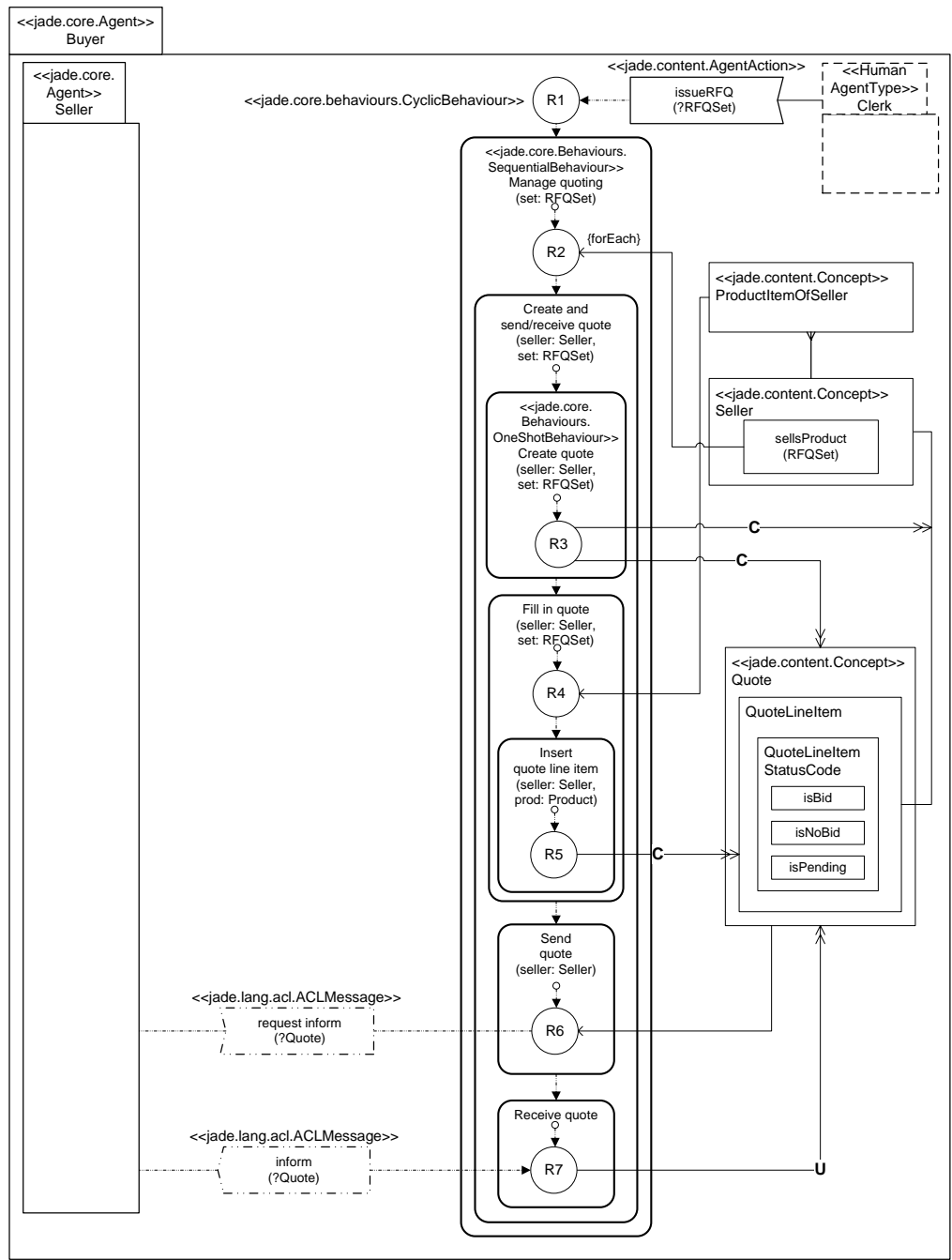
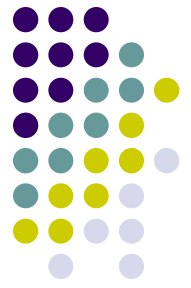
The Knowledge Model

- Basic concepts of both shared and private knowledge of actors are devised.
- Examples: Quote, Buyer, Seller, ProductItemOfSeller.

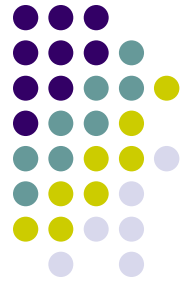
An External AOR Model



An Internal AOR Model



An Internal AOR Model (markup)



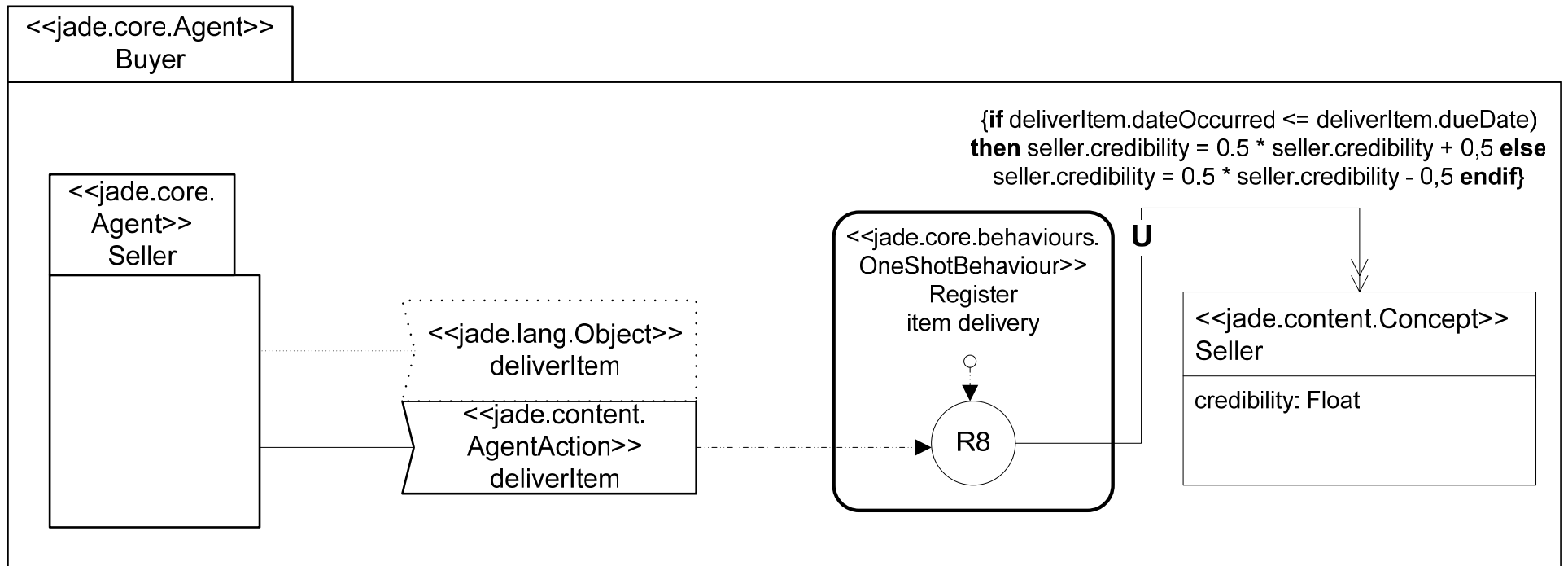
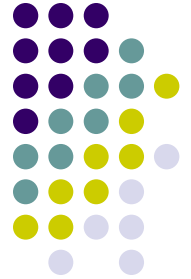
```
<reactionRule>
  <event>
    <startOfActivity>
      <activityTypeName>Manage quoting</activityTypeName>
    </startOfActivity>
  </event>
  <body>
    <forEach>
      <entityTypeName>Seller</entityTypeName>
      <scope>
        <Atom>
          <opr>
            <Rel>sellsProduct</Rel>
          </opr>
          <Var type="RFQSet">set</Var>
        </Atom>
      </scope>
    </forEach>
  </body>
  <head>
    <mainAction>
      <startActivity>
        <activityTypeName>Create and send/receive quote</activityTypeName>
        <Var type="Seller">seller</Var>
        <Var type="RFQSet">set</Var>
        <activityMode>sequential</activityMode>
      </startActivity>
    </mainAction>
  </head>
</reactionRule>
```

XML-schema for representing business process types (based on RuleML)

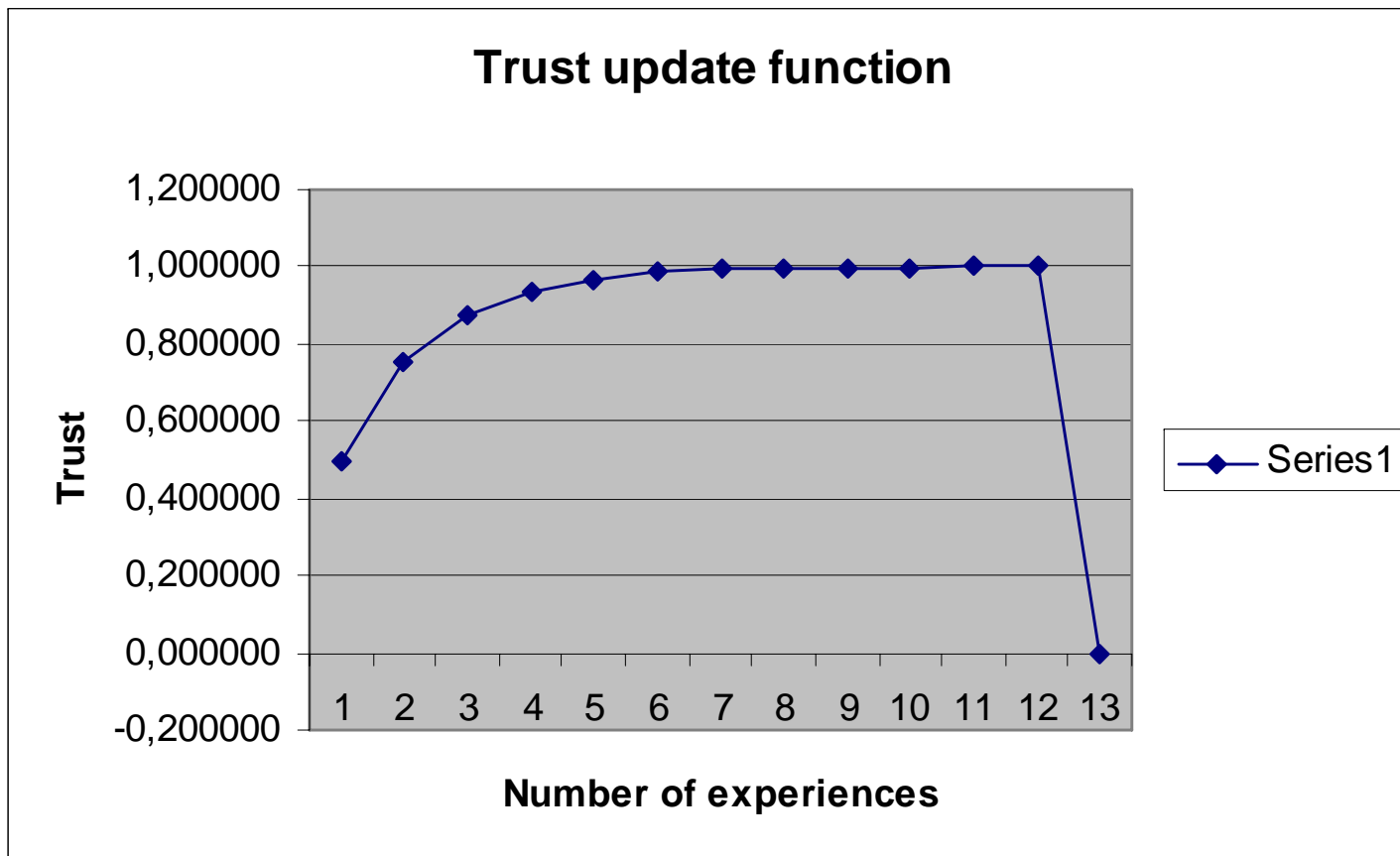
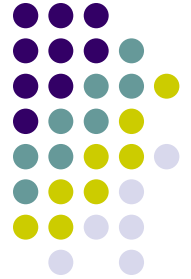


```
<xs:element name="businessProcess" type="businessProcessType"/>
<xs:complexType name="businessProcessType">
  <xs:sequence>
    <xs:element name="processTypeName" type="nameType"/>
    <xs:element name="perspective" type="nameType"/>
    <xs:choice minOccurs="0" maxOccurs="unbounded">
      <xs:element name="reactionRule" type="reactionRuleType"/>
    </xs:choice>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="reactionRuleType">
  <xs:all>
    <xs:element name="ruleName" type="nameType" minOccurs="0"/>
    <xs:element name="event" type="eventTermType"/>
    <xs:element name="body" type="bodyTermType" minOccurs="0"/>
    <xs:element name="head" type="actionEffectTermType" />
  </xs:all>
</xs:complexType>
```

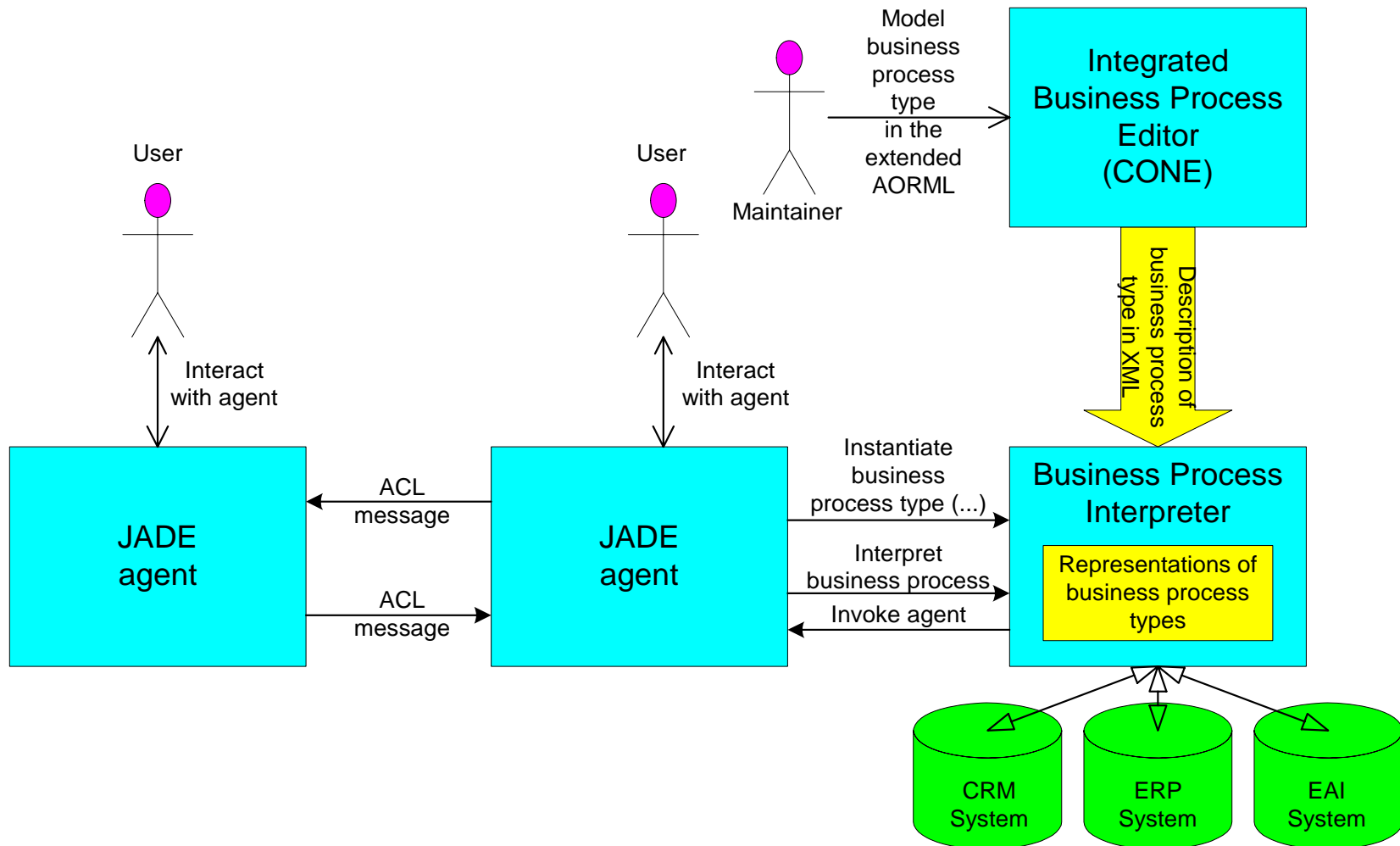
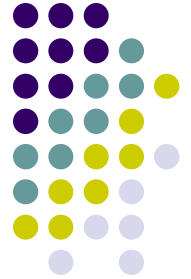
Modelling of trust



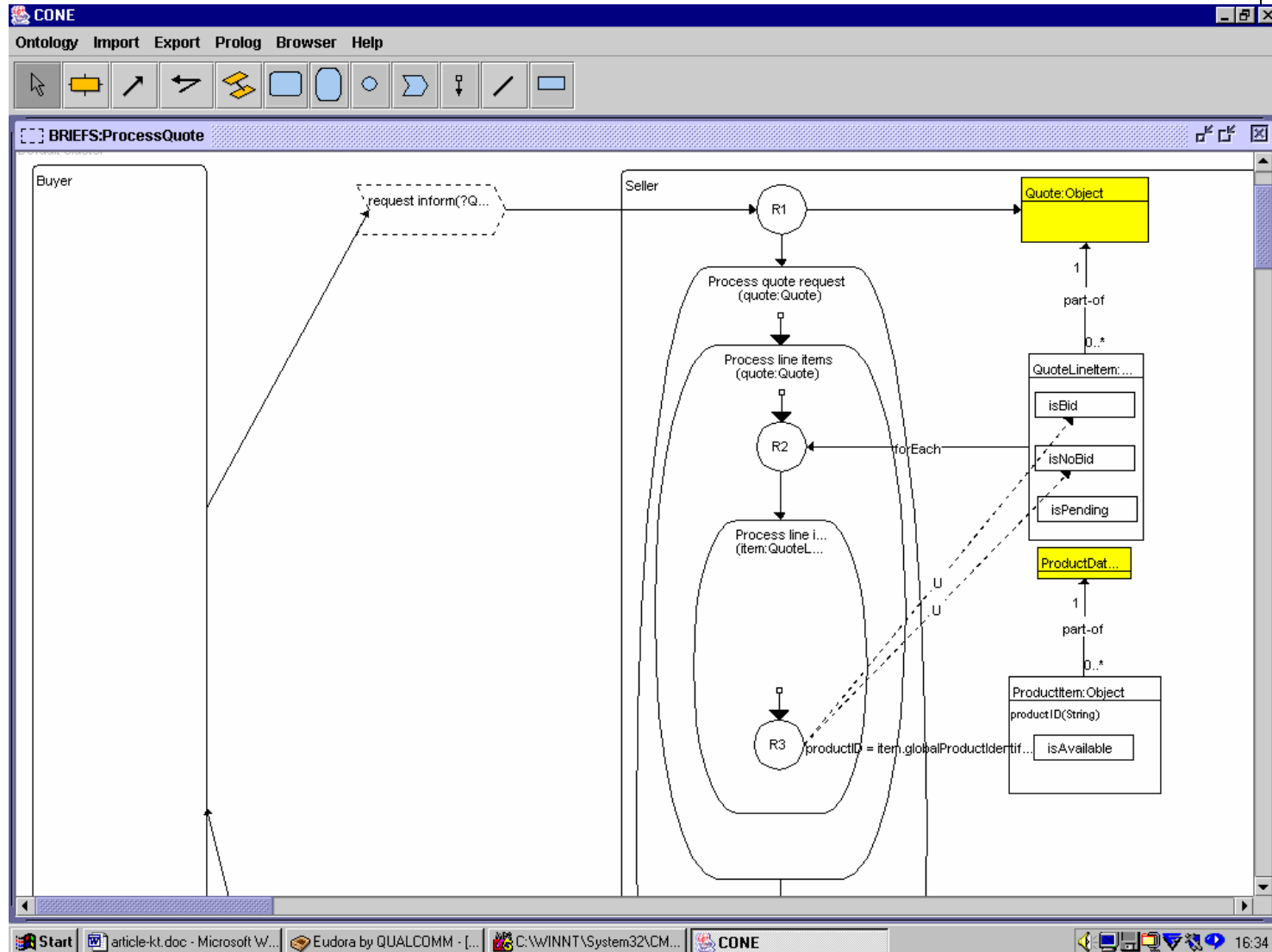
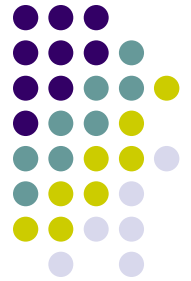
Trust update function



The business process automation system



Integrated Business Process Editor



Buyer Agent



Buyer GUI
Plug And Trade

active RFQs

| product name | product code | valid until | number of responses |
|-----------------------------|--------------|------------------|---------------------|
| MKEM 35 PUNANEN JOHDI... | 4826 | 30.03.2004 00:00 | 1 |
| MKEM 1,5 HARMAA JOHDIN... | 4701 | 30.03.2004 00:00 | 1 |
| MKEM 35 PUNANEN JOHDI... | 4826 | 30.03.2004 00:00 | 0 |
| MKEM 6 PUN 90AST JOHDI... | 4766 | | |
| MKEM 35 PUNANEN JOHDI... | 4826 | | |
| MKEM 2,5 HARMAA JOHDIN... | 4721 | | |
| MKEM 35 PUNANEN JOHDI... | 4826 | | |
| MKEM 2,5 HARMAA JOHDIN... | 4721 | | |
| MKEM 2,5 HARMAA JOHDIN... | 4721 | | |
| SARJA UUSIA ERIK.TYÄOKA... | 5000 | | |
| MKEM 35 PUNANEN JOHDI... | 4826 | | |
| S&P JA UUSIA ERIK.TYÄOKA... | 5000 | | |

refresh details

request a new quote

new RFQ

product description

KYTKENTÄJOHTO

valid from -> until

31.03.2004 00:00

ordered amount **ordered delivery date**

34.0 31.03.2004 00:00

issued by (contact info)

Maija Meikäläinen

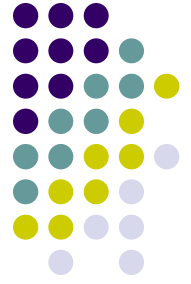
2 responses received and ranked

| bidder name | bidder credibi... | product name | amount | price | delivery date | substitution r... | status |
|-------------|-------------------|----------------|--------|-------|-----------------|-------------------|--------|
| IEKY | 0.39 | MKEM 2,5 HA... | 34.0 | 0.5 | 31.03.2004 0... | | ISBID |
| HEDTEC | 0.7 | MKEM 2,5 HA... | 34.0 | 0.6 | 31.03.2004 0... | | ISBID |

Comparison with related work



- While BPMN allows modelling of non-executable business processes, even incomplete business processes modelled by AOR diagrams can be executed.
- The modelling abstractions proposed by Neiger and Churilov for modelling of goals are unnecessarily complex.



Conclusions

- The modelling technique proposed seamlessly integrates domain analysis with design and implementation.
- The technique makes easier the modelling and following of goals and quality goals.
- The technique includes a markup language based on RuleML.