

A Graphical Framework for the Analysis of Mixed Multi-Unit Combinatorial Auctions

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- Mixed Multi-Unit Combinatorial Auctions
- The Mixed Multi-Unit Auction Platform
- Automated design of electronic institutions

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What are Mixed Multi-unit Combinatorial Auctions?

- Suppose that an auctioneer allows agents to bid for goods to buy, to sell or to transform
- A bidder would be able to express his ability to transform goods at a certain cost:
 $1 \text{ gin} + 1 \text{ lemon juice} \longrightarrow 1 \text{ gin lemon} \quad \text{for } 5 \$$
- We call the resulting model mixed auctions (direct and reverse auctions combined) **Mixed Multi-Unit Combinatorial Auctions**
- Generalizes several type of combinatorial auctions (Cerquides et al, IJCAI 2007)

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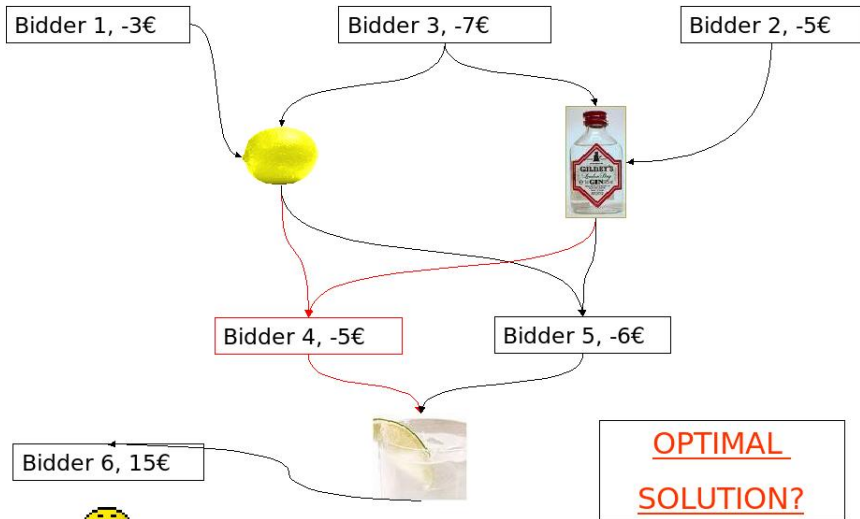
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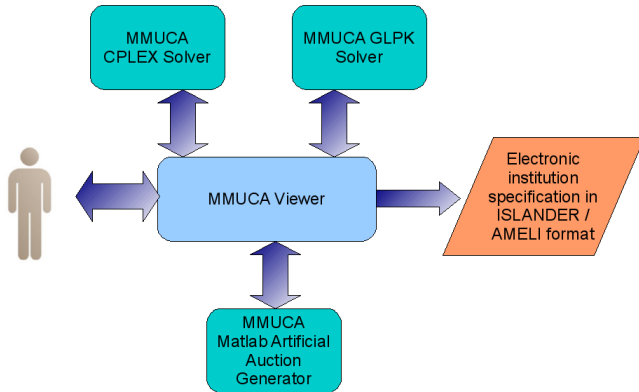
Example of MMUCA: GIN & LEMON



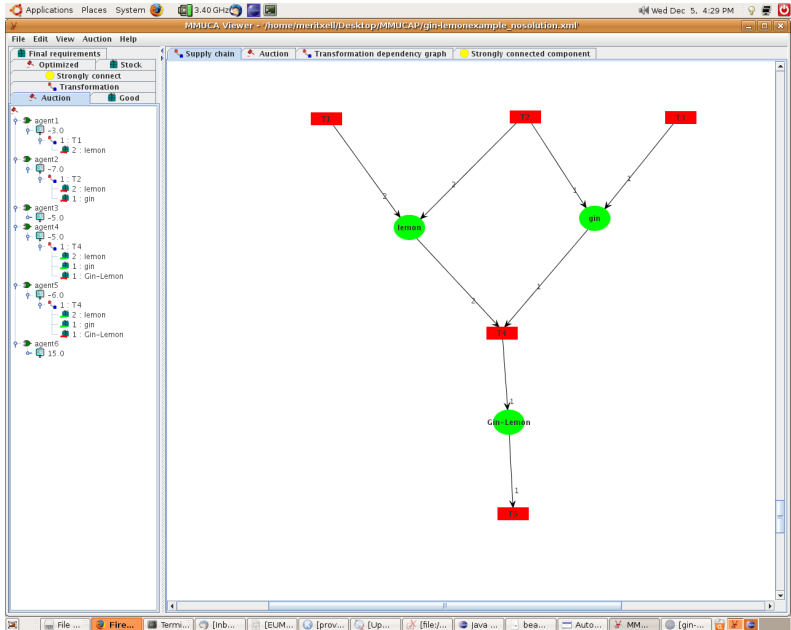
- **Goals:**

- Prototype and demonstrate the possibilities of application of MMUCA for Supply Chain Formation.
- Experiment with graphical visualization tools and user interfaces for MMUCA and evaluate their usefulness and comprehensibility.
- Integrate access to MMUCA tools.
- Automate the process of generation of an electronic institution for Supply Chain Formation

Architecture of the MMUCA platform



MMUCA Viewer



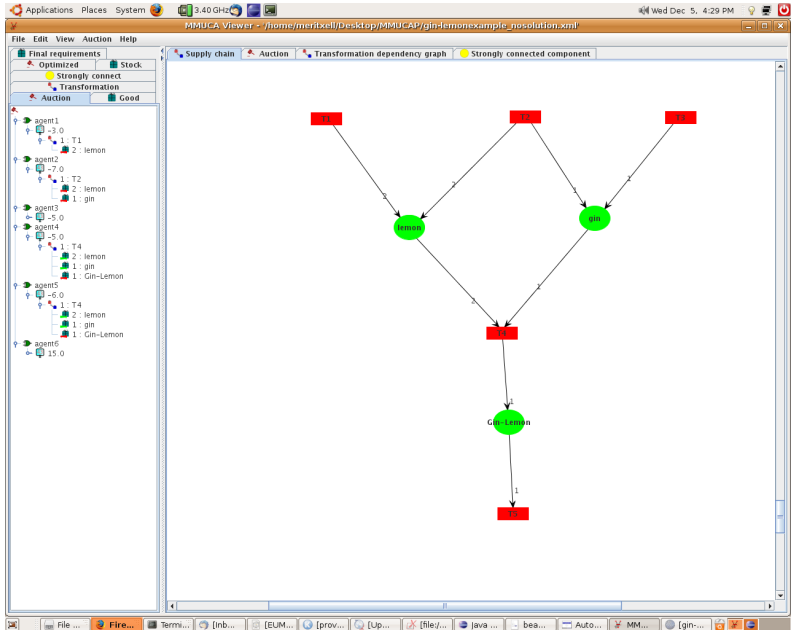
The Supply Chain Generation Process

- An auctioneer starts a Mixed Multi-Unit Combinatorial Auction (MMUCA) and agents are free to submit their bids
- Bids submitted are loaded in the MMUCA viewer
- The auctioneer collects all bids and solves the winner determination problem to assess the optimal supply chain configuration.
- Optimal solution is loaded in the MMUCA viewer
- Automated generation of the supply chain processes as the specification of an electronic institution
The resulting specification can be either:
 - Uploaded by ISLANDER for further refinements
 - Uploaded by AMELI to run the supply chain as an electronic institution

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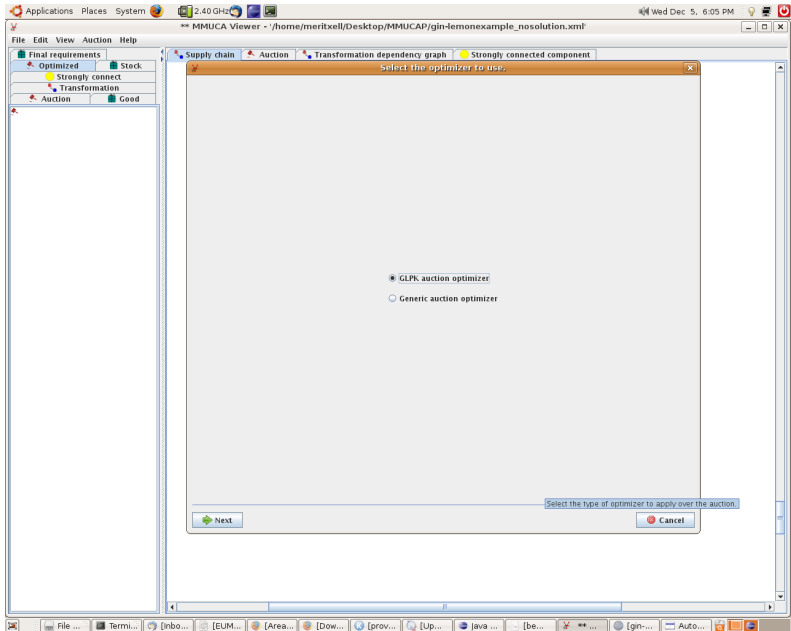
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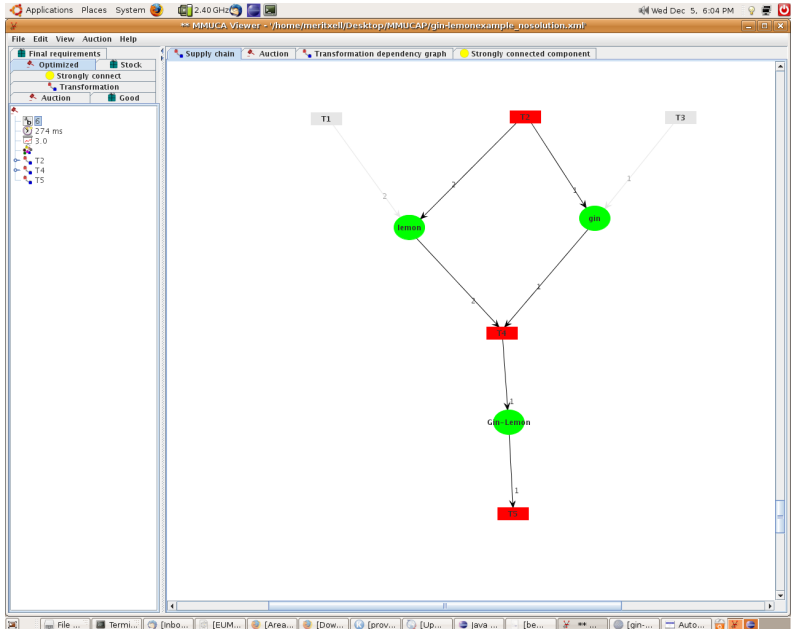
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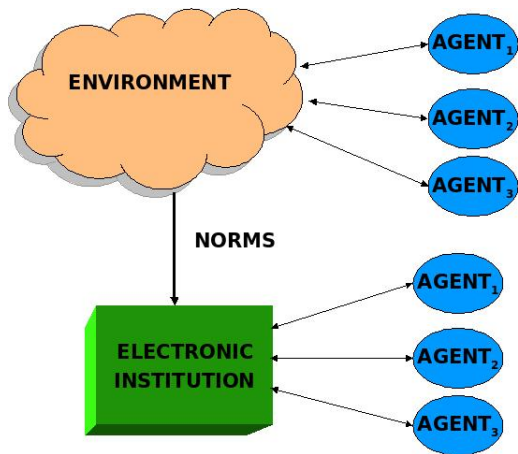
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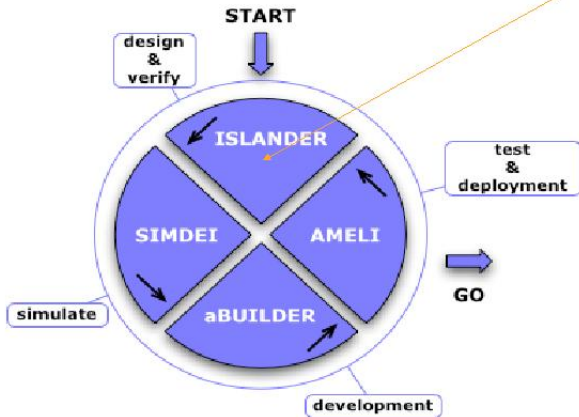
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Institutions in the sense proposed by North "... set of artificial constraints that articulate agent interactions"

<http://e-institutions.iiia.csic.es>

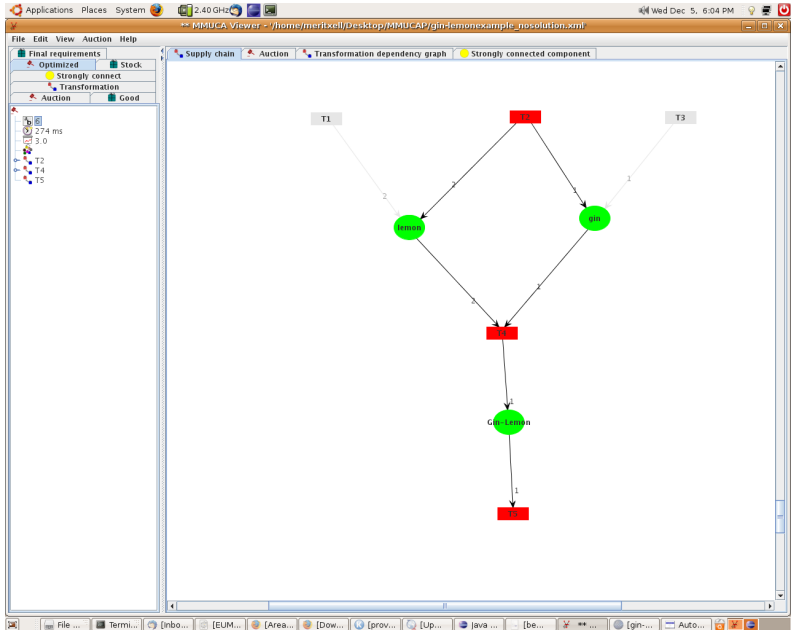
**INSTITUTIONAL
DESIGN
BY HAND!**

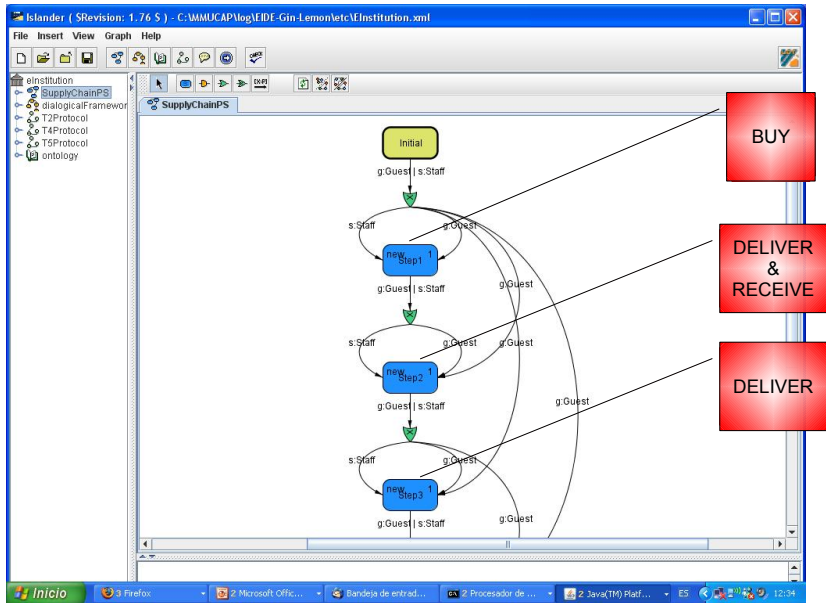


The xml specifies for the generated supply chain:

- **Peformance Structure**
- **Roles**
- **Ontology**
- **Scenes & protocols**

MMUCA Viewer





Demo: MMUCA platform

