Multi-Attribute Auction Mechanism for Supporting Resource Allocation in Business Process Enactment

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Objectives & Motivation

- Resource allocation in business process when production agenda, resource needs and resource availability are unknown.

- Multi-Attribute: take into account other attributes besides the economic cost (time, quality, etc.)

<table>
<thead>
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<th>Resource Providers (RP) with different resource characteristics</th>
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<tbody>
<tr>
<td>Task</td>
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<tr>
<td>RP1</td>
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<tr>
<td>RP2</td>
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<td>RP3</td>
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<td>RP n</td>
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Proposed Solution

- Second Price Reverse Multi-Attribute Auction:
Proposed Solution

- Second Price Reverse Multi-Attribute Auction:
  - Evaluation function: \( V(cost, attributes) \)
  - Auctioneers are the buyers, bidders the sellers.

- The winning bid receives the second best price.
- The winning bidder receives the cost it should have bid to equal the second best bid.

- If breaking the agreement (attributes are not the bided ones), the bidder receives the cost it should have bid to win the auction with the delivered attributes.

- Incentive compatible mechanism for independent auctions.
Experimentation & Results

Strategy-proofness of the mechanism

Comparison with other Multi-attribute mechanisms

Sensibility to cheating agents: delays in tasks

Sensibility to cheating agents: Agents utility