

Multi-deal Negotiation

Negotiation Strategies for Combining Partial Deals in One-To-Many Negotiation

CWI

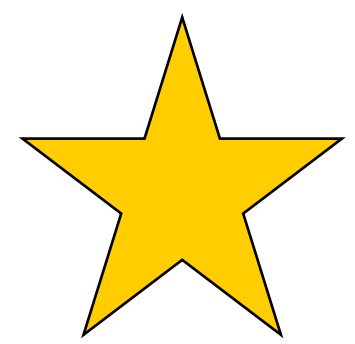
Centrum Wiskunde & Informatica



Tamara C.P. Florijn
Tamara.florijn@cwi.nl



Introduction to Multi-agent Negotiation



Key aspects:

- One-to-many negotiation
- Incomplete information about preferences opponents
- Multi-deal: the result will consist of multiple smaller agreements between the agent and several opponents



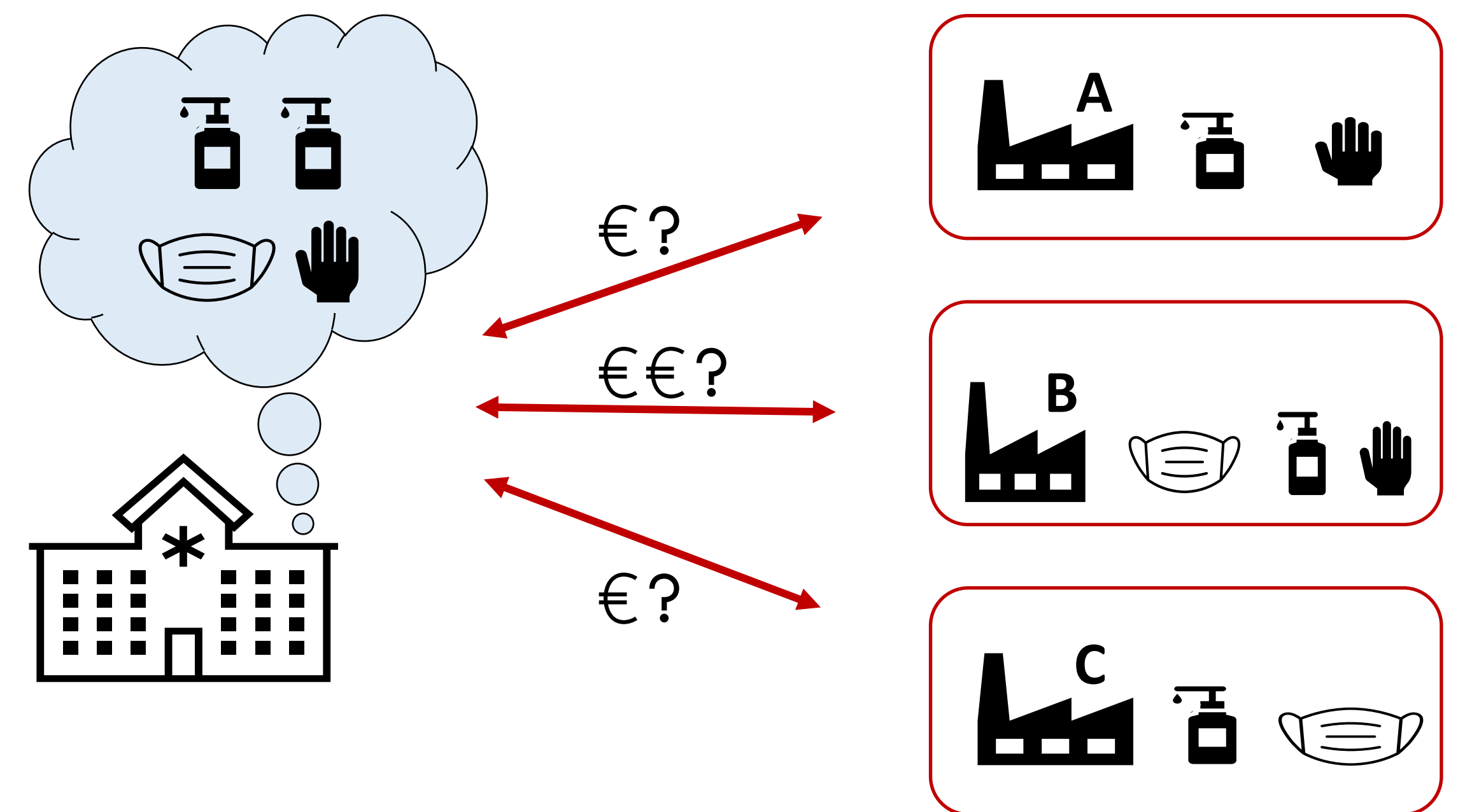
Goal: Reach a (good) agreement



Main challenge:

- Interconnectivity of subnegotiations
- Unpredictability of course of negotiation

Example: Procurement for Hospital



- Hospital needs facemasks, disposable gloves and soap
- Several suppliers with own stock, price, delivery time etc.
- Hospital does not have to commit to one supplier for full list



With whom to negotiate?
About what?
When to commit to a deal?

Protocol Challenges

Flexibility is required

- Immediate binding offers forces agents to send out mutually exclusive offers
- Solution: allow decommitment or two-side acceptance

Selection of utility function

- Should allow evaluation combination of deals

No centralized approach

Reasons:

- Privacy about preferences
- Not optimal for individual self-interested agents
- Chaotic/dynamic nature

Strategy Challenges

Coordination strategy

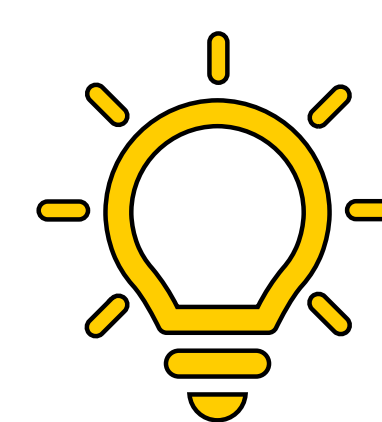
- Decide what sellers to negotiate with
- Divide the subgoals among the subnegotiators
- Dynamically adapt the strategy

Strategy for subnegotiators

- Other subnegotiations may function as back up plan
- Our recent work studies the influence of reservation values
- Deal with changing goals and dynamic utility functions



Applications



- Procurement
- Planning assistant
- Supply chain management
- ...



Supervised by
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