Business process optimization

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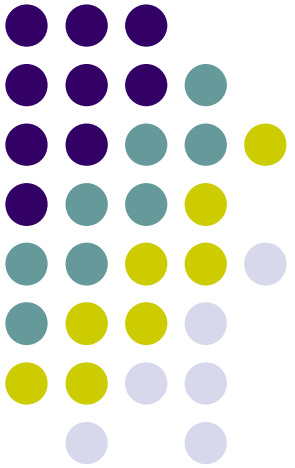
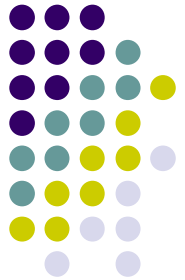
Oasa Computers

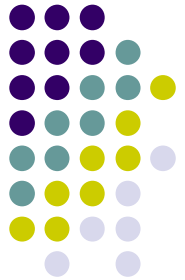


Goal, background



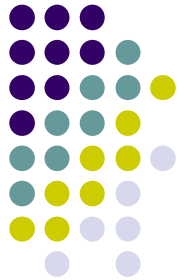
- Process optimization done usually manually
  - Cost demanding
  - Not sufficient quality of outputs
- Existing tools are closed and tightly related to only one way of optimization
  - Usable only for one domain of processes

Goal



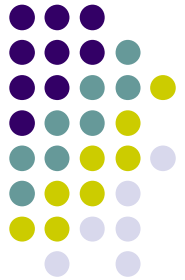
- Introduce way for process optimization suitable for wide range of situations and process types
  - Define model suitable for process modelling and providing background for various optimizations
  - Build tool on grounds of above model
  - Identify methods for optimization of above model
  - Build chosen methods into tool

Current status



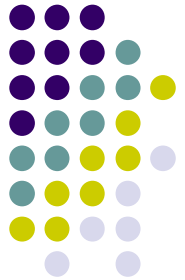
- Model for process modelling is chosen
  - High level coloured Petri-Nets with time
- Tool for modelling is being build in cooperation with DCConcept company
- Following methods chosen for process optimization
  - Fuzzy sets
  - Theory of constraints
  - Bayesian networks

Why chosen methods



- Fuzzy sets
  - Used in uncertainty
  - Optimization by selecting best scenario
- Theory of Constraints
  - Used in certainty
  - Optimization by selecting best scenario
  - Optimization by proposing changes in model
- Bayesian networks
  - Representation of rules in process
  - Allows to learn structure

Theory of constraints (ToC)

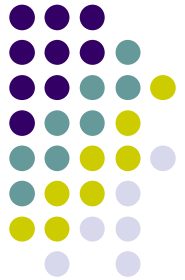


- Very finance oriented
- Based on finding of constraint in system
- Defines
  - Throughput – money got for sell
  - Reserves – all money spent for not ready goods
  - Operating expenses – all money needed to change reserves to throughput

Optimization using ToC

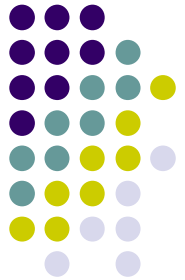
- Current model is capable to provide information for ToC.
- Any process change causing one of following is improvement
  - Increasing throughput
  - Decreasing reserves
  - Decreasing operating expenses

Optimization using ToC, cont.



- Two ways of using ToC
  - Finding of constraints or bottlenecks
  - Applying ToC metrics for several variants of business process model

Fuzzy sets

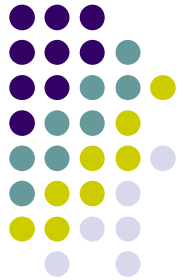


- Possible use of human language
- Can work with uncertainty
- Fuzzy rules are like business rules

Optimization with fuzzy sets

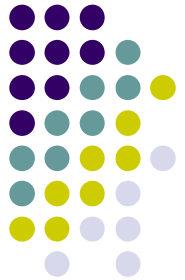
- Advantages of fuzzy
  - Get 1st draft of future...
    - Be ready fulfill dynamic market needs
    - Prepared scenarios
  - With new coming information, draft become more precise

Optimization with fuzzy sets



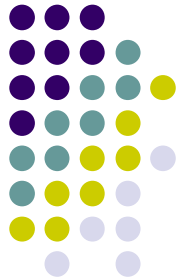
- fuzzy
  - define language based variables
    - like “production is low, medium, high”
  - use of human language
    - set parameters it’s quite natural

Optimization with fuzzy sets



- inference
  - define system behavior with IF, THEN rules
    - very similar with business process description
  - with language based variables and system rules you get result

Next steps



- Build algorithm for applying ToC and Fuzzy sets for optimization
- Evaluate possibility of using Bayesian networks for process optimization
- Cooperate with DCConcept to build coplete integrated solution for modelling and optimization of business processes based on principles described here