Business Process Technology
Master Seminar

BPT Group

Summer Semester 2008
Agenda

- Official Information
- Seminar Timeline
- Tasks Outline
- Topics
Title: Business Process Technology Seminar

Credit Points: 6

SWS: 4

Registration Deadline: 2 May 2008
Seminar Timeline

- Topics submission
- Short presentation
- Paper draft submission
- Technical presentation
- Review submission
- Final presentation
- Final paper submission

Today  22 April  8 May  3 July  3 July  10 July  17 July  20 July
Topic Distribution

three topics ranked by preference + name, student ID number

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Grading System

- short presentation
- technical presentation
- review submission
- final presentation
- final paper submission
Outline Presentation

5-10 min
problem outline
possible solutions

short presentation
~ 30 min talk
+10 min discussion

technical aspects
Review Submission

- Max 16 pages
- LNCS style
- PDF

Paper draft submission

2 peer reviews

Review submission
Final Presentation

~ 30 min talk
+10 min discussion

overview of the whole work
Final Paper Submission

max 16 pages
LNCS style
PDF

final paper submission
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Ahmed Awad

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Using BPMN-Q to show violation of „Execution ordering compliance rules“

- Build a plug-in to Oryx that:
  - Review literature for tool support for explanation of violation to compliance rules.
  - Use BPMN-Q's capabilities to express queries about the structure of process models to define queries (patterns) that would capture a violation of user-defined execution ordering constraint between activities.
  - Extend BPMN-Q notation if necessary in order to complete this task.
Example

- Requirement: In all instances be sure that “If A is executed B will eventually be executed“.

- Formally this is equivalent to LTL expression $G(A \rightarrow F(B))$
  - This is violated by the counter example execution instance ACD.
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Gero Decker

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Usability of choreography languages

What notation is better suited for the human modeler?

- Read test: User retrieves information from a given model
- Write test: User creates models for given scenarios

Design, conduct and interpret experiment
Advanced Petri net constructs for an execution engine

- Background
  - Execute BPMN models → transform to Petri nets → execute PN
  - Transformations available for place/transition nets
- Question: Would high-level constructs increase performance / simplify transformations?
- Validation through prototype (extending existing PN engine)
Performance considerations for process execution engines

- **Background**
  - Process execution engine based on XML Petri nets
  - Performance is key

- **Question**
  - How do specific database designs / caching strategies / distribution strategies affect performance?

- **Validation through prototype (extending existing PN engine)**
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Alexander Großkopf

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Transforming EPCs to BPMN

**Context:**

EPCs are widely spread in the industry and many processes have been modelled using this language. By now BPMN is the emerging process modelling standard. Transforming EPC models to BPMN however is not a simple task.

**Task:**

Identify a mapping from EPCs to BPMN and the mismatches in the language concepts. Propose extensions to annotate EPCs for a more comprehensive mapping. Envision how manual annotations could be automated for large amounts of models. Implement a prototype to show the mapping from annotated EPCs to BPMN.

**Literature:**

Siemens Report (by Frank Puhlmann)

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Measure consistency of model hierarchies

**Context:**
Processes are modeled on different levels of abstraction for different purposes. The connection between models on different levels can be very different. It may range from strong hierarchical refinement to arbitrary associations.

**Task:**
Investigate latest research and existing approaches to connect models on different levels of abstraction. Identify metrics to measure the degree of consistency which models models at different abstraction levels can have.

**Literature:**
- *Inubit BPM-Suite*, www.inubit.com

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Master Seminar

Artem Polyvyanyy

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**Context:** Flexible process graph (FPG) is a novel approach to model ad-hoc processes. As formal grounding, the approach uses hypergraphs, where each edge can associate any number of nodes. Hypergraphs are used to define execution semantics of ad-hoc processes formally.

**Task:** Though FPG is an approach designed specifically to model ad-hoc business processes it can be applied to model regular control-flow patterns. It should be studied how well does FPG suits this task. Based on the evaluation results, FPG extension proposals should be formulated. These might include introduction of minimal set of hyperedge types, extension of the process execution semantics, etc. Proposed extensions should allow to model regular control-flow patterns by means of FPG.

**Literature:**

Hypergraph-based modeling of Control-Flow Patterns

a) A → B

b) A, B, C
Hypergraph-based modeling of Control-Flow Patterns
Hypergraph-based modeling of Control-Flow Patterns
Abstracting from Business Process Details

Context: Many companies have documented their business processes well in the form of models. Unfortunately, in many cases the resulting models are rather complex, so that the overall process logic is hidden in low level process details. Abstraction is the technique aimed to generalize details to derive model overview.

Task: A general process model formalism should be extracted from existing process modeling techniques: EPC, Petri nets, Workflow nets. Elementary abstractions, rules that define how process fragments can be generalized, should be developed using proposed process formalism and extend the initial set which is proposed in the literature. Each introduced elementary abstraction should specify process semantics for the abstracted process fragment.

Literature:
- "Reducing the Complexity of Large EPCs", Artem Polyvyanyy, Sergey Smirnov, Mathias Weske
Abstracting from Business Process Details
Probabilistic Business Process Model Abstraction

- **Context:** In many cases business process models are enhanced with additional data like: probabilities of process control flow edge transitions or average time intervals required to execute process functions. This information can be used for the benefit of process model abstraction task.

- **Task:** A general process model formalism should be extracted from existing process modeling techniques: EPC, Petri nets, Workflow nets. Mechanisms aimed to extract core process logic based on the probabilities of process edge transitions should be developed using proposed process formalism.

- **Literature:**
  - "Reducing the Complexity of Large EPCs", Artem Polyvyanyy, Sergey Smirnov, Mathias Weske
Probabilistic Business Process Model Abstraction
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Sergey Smirnov

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Process Model Abstraction
Sequential Abstraction

Diagram showing a sequence of states and transitions labeled with $e_0$, $f_1$, $e_1$, $f_2$, $e_2$, $e_0$, $f_2$, $e_2$ and $f_3$. The transitions are denoted with $p_{e0}$, $p_{f1}$, $p_{e1}$, $p_{f2}$, $p_{e2}$, and $p_{f3}$. The diagram illustrates the flow from one state to another, with arrows indicating the direction of the transitions.
Dead End Abstraction
Block Abstraction
Loop Abstraction
Formalization of EPC Elementary Abstractions: Which EPCs Can be Reduced to One Function?

Literature:

- Artem Polyvyanyy, Sergey Smirnov, Mathias Weske. Reducing the Complexity of Large EPCs, 2008
Fuzzy Mining: Lessons Learned for Process Model Abstraction

Literature:
- Artem Polyvyanyy, Sergey Smirnov, Mathias Weske. Reducing the Complexity of Large EPCs, 2008
Abstraction of Process Models Captured in BPMN

Literature:
- Artem Polyvyanyy, Sergey Smirnov, Mathias Weske. Reducing the Complexity of Large EPCs, 2008
Refer to seminar homepage

https://bpt.hpi.uni-potsdam.de/Public/BPT-SS2008

Regarding seminar organization and submissions

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Regarding the topics

see contact assigned to each topic
Questions