Modeling and Execution Support for State-Centric Processes

Juliane Siegeris,
Eindhoven 26.6.2014
Agenda

1. Presentation of the main ideas of the BPM14-paper:

„From a family of state based PAIS to a configurable and parameterized business process architecture“
by Andreas Rulke and Juliane Siegeris

2. Research Questions in the context of Variant-Management
Modeling paradigms

**activity driven**

Focus is on **activities** and there (predefined) **order** relation

→Suitable to describe business processes, i.e. set of activities that contribute towards a common business goal within a certain time.

**state driven**

Focus is on **states** and **events** which entail changes of the state.

→Suitable to describe the **life cycle** of (possible very long living) **objects**
Application domain: Product Master Data Management

is concerned with the life-cycle of product data:
Application domain: 
Product Master Data Management

is concerned with the life-cycle of product data:

A supplier might produce such catalogs
  • for different groups of products,
  • countries and
  • in different languages.

the grouping of such product descriptions is denoted as an assortment.
Application domain:
Product **Master Data Management**

- In order to guarantee high quality of the product data

400 audits automatically test the products data / the media files

Human data editors manually check the quality of the product data.

Approved changes are taken over to the shared area
Application domain: Product **Master Data Management**

Key characteristic:

→ An assortment in a MDS usually has **a long lifetime**.

→ Activities are triggered by external events / state change
Scenario / Application domain: Product **Master Data Management**

Key characteristic:

→ An assortment in a MDS usually has **a long lifetime**.

→ Activities are triggered by external events / state change

Challenges:

• Model state centric-process with BPMN2.0

• Use BPMS for execution support

→ **but avoid long running transactions!**
### Challenge I:
Model state centric-process with BPMN2.0

<table>
<thead>
<tr>
<th>ID</th>
<th>BPMN element used to depict state</th>
<th>BPMN element used to model events</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Data objects with state information</td>
<td>-</td>
<td>[13, Fig. 152], [17, p. 32]</td>
</tr>
<tr>
<td>A2</td>
<td>Conditional event</td>
<td>-</td>
<td>BPMN 2.0 Spec. [14, p.251—254]</td>
</tr>
<tr>
<td>A3</td>
<td>-</td>
<td>Catching event, e.g. following an event based gateway</td>
<td>See pattern “deferred choice” [16, pp. 17–18]</td>
</tr>
<tr>
<td>A4</td>
<td>Edge-labels of XOR-gateway</td>
<td>-</td>
<td>BPMN 2.0 Spec. [14, p. 290]</td>
</tr>
<tr>
<td>A5</td>
<td>Activities/Sub-processes</td>
<td>Consecutive XOR gateways for different events</td>
<td>[2, pp. 48–50, 85–98]</td>
</tr>
<tr>
<td>A6</td>
<td>Activities/Sub-processes</td>
<td>Attached interrupting events</td>
<td>[17, pp. 83–106, pp. 119–144], [14, pp. 254-257]</td>
</tr>
</tbody>
</table>
Challenge I:
Model state centric-process with BPMN2.0

<table>
<thead>
<tr>
<th>ID</th>
<th>BPMN element used to depict state</th>
<th>BPMN element used to model events</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Data objects with state information</td>
<td>-</td>
<td>[13, Fig. 152], [17, p. 32]</td>
</tr>
<tr>
<td>A2</td>
<td>Conditional event</td>
<td>-</td>
<td>BPMN 2.0 Spec. [14, p.251—254]</td>
</tr>
<tr>
<td>A3</td>
<td>-</td>
<td>Catching event, e.g. following an event based gateway</td>
<td>See pattern “deferred choice” [16, pp. 17–18]</td>
</tr>
<tr>
<td>A4</td>
<td>Edge-labels of XOR-gateway</td>
<td>-</td>
<td>BPMN 2.0 Spec. [14, p. 290]</td>
</tr>
<tr>
<td>A5</td>
<td>Activities/Sub-processes</td>
<td>Consecutive XOR gateways for different events</td>
<td>[2, pp. 48–50, 85–98]</td>
</tr>
<tr>
<td>A6</td>
<td>Activities/Sub-processes</td>
<td>Attached interrupting events</td>
<td>[17, pp. 83–106, pp. 119–144], [14, pp. 254-257]</td>
</tr>
</tbody>
</table>
Challenge I: Model state centric-process with BPMN2.0

Our Solution:

States modeled with BPMN-Activities

Events modeled with BPMN-Activities

attached BPMN-Events
State-Centric Operational Model (SCOM)
Challenge II:
Use BPMS for execution support
→ but avoid long running transactions!
Historical MDMS Process architectures

Evolution of the product family of MDMS:
Process Architecture of MDMS2

Strength of the architecture:
- Interoperation of state controller and the DSL Processor as PAIS
- Rollback to earlier states of the assortments

Weaknesses:
- Hard-coded state automaton
- Hard-coded tasks that trigger the DSL-processes.
- Hard-coded auxiliary processes that prepare and post-process the process invocations
State-Centric Operational Model (SCOM)
Possible refinement of state representing activity
Process Architecture of MDMS3 (detail)
Benefits of the proposed architecture

1. **Reuse:** The controller processes P-C are stable, in a way that the product family of different applications that are realized with MDMS-3 share the same set of control processes.

2. **Runtime changes:** Modifications to the state automata influence the process execution at runtime. Changing the state automata other (or even new) application specific processes can be invoked.

3. **Governing of long-living objects:** Instances of the application specific processes are invoked only if a state change has taken place and a state transition is possible. Long-living transactions are avoided.
 „From a family of state based PAIS to a configurable and parameterized business process architecture“

by Andreas Rulke and Juliane Siegeris

We also:

→ Relate the approach to the 20 UseCases
→ Give an idea how to proof the correctness of the derived architecture
„From a family of state based PAIS to a configurable and parameterized business process architecture“
by Andreas Rulle and Juliane Siegeris

We do not (open research questions):

→ proof the correctness of the derived architecture
→ do Process-Mining for state-centric processes
→ give further application domains for the use of state-centric processes (SCPs)
→ formalize SCPs, SCOM or the proposed state-centric business process architecture
→ explore synergies from SCPs with respect to document-centric, data-centric, artifact-centric BPM
Agenda

1. Presentation of the main ideas of the BPM14-paper:

„From a family of state based PAIS to a configurable and parameterized business process architecture“

by Andreas Rulke and Juliane Siegeris

2. Research Questions in the context of Variant-Management
2. Research Questions in the context of Variant-Management

Assume huge variety of different process instances. Aim is to have a (super-)model covering them all.

1. Optimize the model with respect to the number of different variants (instance graph)

2. Formulate criteria how to cut the supermodel, such that it is still manageable

3. Find out the relation between necessary measuring points within the process model and belonging variants in order to gain relevant events for process monitoring