Integration of BPMN and CMMN

Knut Hinkelmann

Based on joint work with Arianna Pierfranceschi

FHNW University of Applied Sciences and Arts Northwestern Switzerland
knut.hinkelmann@fhnw.ch | arianna.pierfranceschi@fhnw.ch

Acknowledgements: This work is supported by the EU-funded project LearnPAd, FP7-619583, http://www.learnpad.eu
Classification of Processes

**structured process**
- structured process flow
- many repetitive elements
- no degrees of freedom for people

**case**
- process flow can partly be structured
- some repetitive elements
- degrees of freedom for people

**ad hoc process**
- process flow cannot be structured – new tasks on the fly
- few repetitive elements
- very high degrees of freedom for people

can be modelled

partly translated from (Gadatsch 2005, S. 44)
Classification of Processes

- **structured process**
  - BPMN
  - can be modelled

- **case**
  - CMMN
  - cannot be modelled

- **ad hoc process**
  - process flow cannot be structured – new tasks on the fly
  - few repetitive elements
  - very high degrees of freedom for people

partly translated from (Gadatsch 2005, S. 44)
Issues

- Can we strictly separate case from process?
- Can we decide in advance which model type is appropriate?
- Is there no process flow in ACM?
Case Study: Admission to Master Program
Separate BPMN from CMMN

Admission Process

- Study assistant
  - Application arrived
  - Prepare eligibility check
    - Candidate eligible?
      - Invite for interview
      - Candidate not eligible
        - Reject candidate
        - Candidate rejected
  - Candidate eligible?
    - Invite for interview
      - Candidate not eligible
        - Reject candidate
        - Candidate rejected

- Dean
  - Assessment form
  - Check eligibility
    - Validate eligibility
      - Candidate eligible?
        - Decide for acceptance
          - Candidate not eligible
            - Determine tuition fee
            - Candidate accepted

- Candidate accepted
  - Send acceptance letter
    - Candidate accepted

- Candidate rejected
  - Send rejection letter
    - Candidate rejected
Implicit Control Flow in CMMN

What does it mean?

Visible conditions are better for understanding.
Explicit Control Flow in BPMN

What does it mean?
Who executes a Tasks?

Implicit in roles

Visualized
## Comparing Elements of BPMN and CMMN

<table>
<thead>
<tr>
<th>BPMN</th>
<th>CMMN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task types:</strong> User, Manual Script, …</td>
<td>Task types: Human</td>
</tr>
<tr>
<td><strong>Subprocesses</strong></td>
<td>Process/Case Tasks</td>
</tr>
<tr>
<td><strong>Events:</strong> start – intermediate – end catching – throwing</td>
<td>event listeners (catching) implicit events, milestones</td>
</tr>
<tr>
<td><strong>Gateways/Events</strong></td>
<td><strong>Sentries</strong></td>
</tr>
<tr>
<td><strong>Sequence Flow</strong></td>
<td>Sentry with empty condition</td>
</tr>
<tr>
<td><img src="image1" alt="Sequence Flow Diagram" /></td>
<td><img src="image2" alt="Sequence Flow Diagram" /></td>
</tr>
<tr>
<td><strong>Lanes</strong></td>
<td>Discretionary Tasks</td>
</tr>
<tr>
<td><img src="image3" alt="Lanes Diagram" /></td>
<td>Stages</td>
</tr>
<tr>
<td><strong>Pool</strong></td>
<td>Roles</td>
</tr>
<tr>
<td><img src="image4" alt="Pool Diagram" /></td>
<td><img src="image5" alt="Folder Diagram" /></td>
</tr>
</tbody>
</table>
## Rules in BPMN and CMMN

<table>
<thead>
<tr>
<th>BPMN</th>
<th>CMMN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business rules (tasks)</td>
<td>---</td>
</tr>
<tr>
<td>Events/gateways</td>
<td>Sentries</td>
</tr>
<tr>
<td>---</td>
<td>Applicability rules (planning tables)</td>
</tr>
</tbody>
</table>
Combining BPMN and CMMN

A combination of control flow elements of BPMN and discretionary tasks and planning elements of CMMN

a suitable language to deal with any kind of process.
BPCMN: A combined Process and Case Modeling Language

Silver (2010): BPMN covers about 90% of what is needed for business processes.

Start with BPMN and add the necessary case aspects.
BPCMN: An Example
Proposal for a combined Process and Case Modeling Language

- Activities can be
  - integrated in sequence flow (→ BPM)
  - initiated by Sentry (→ ACM)

- Gateways for explicit control flow

- Lanes for assignment of tasks to participants

- Allow discretionary tasks
## Comparing Elements of BPMN and CMMN

<table>
<thead>
<tr>
<th>BPMN</th>
<th>CMMN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task types:</strong> User, Manual Script, ...</td>
<td>Task types: Human</td>
</tr>
<tr>
<td>Subprocesses</td>
<td>Process/Case Tasks</td>
</tr>
<tr>
<td><strong>Events:</strong> start – intermediate – end catching – throwing</td>
<td>event listeners (catching) implicit events, milestones</td>
</tr>
<tr>
<td><strong>Gateways/Events</strong></td>
<td>Sentries</td>
</tr>
<tr>
<td><strong>Sequence Flow</strong></td>
<td>Sentry with empty condition</td>
</tr>
<tr>
<td>Lanes</td>
<td>Discretionary Tasks</td>
</tr>
<tr>
<td>Pool</td>
<td>Stages</td>
</tr>
<tr>
<td>Folder</td>
<td>Roles</td>
</tr>
</tbody>
</table>
# Rules in BPMN and CMMN

<table>
<thead>
<tr>
<th>BPMN</th>
<th>CMMN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business rules (tasks)</td>
<td>---</td>
</tr>
<tr>
<td>Events/gateways</td>
<td>ECA rules</td>
</tr>
<tr>
<td></td>
<td>Sentries</td>
</tr>
<tr>
<td></td>
<td>Applicability rules (planning tables)</td>
</tr>
</tbody>
</table>
BPCMN covers structured and case processes

**structured process**
- structured process flow
- many repetitive elements
- no degrees of freedom for people

**case**
- process flow can partly be structured
- some repetitive elements
- degrees of freedom for people

**ad hoc process**
- process flow cannot be structured – new tasks on the fly
- few repetitive elements
- very high degrees of freedom for people

partly translated from (Gadatsch 2005, S. 44)
Extension: Modeling Business Logic

knowledge *about* processes:
- process flow
- roles
- resources
→ process logic

knowledge *in* processes:
- supports practice
- skills, experiences
- know how
→ business logic
Using DMN to model Decision Logic

Study assistant

- Check eligibility
  - Check completeness of documents

- Check accreditation of university
  - Look in Anabin
  - Look in unimanic.com
  - Ask public authority

- Check bachelor degree

- Calculate average grade

Dean

- Check eligibility
  - Compare to Swiss grades

- Eligibility Rules
  - Eligibility

- Study Regulation
  - Data Form
  - Bachelor Degree

- Discuss with dean
  - Register student

- Candidate Eligible
- eligible?
DMN – Eligibility Check

Candidate Eligible

Eligibility Rules

Bachelor Degree

Study Regulation

Data Form

Candidate Eligible

<table>
<thead>
<tr>
<th>FC</th>
<th>Bachelor Degree</th>
<th>University accredited</th>
<th>eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>3</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>4</td>
<td>yes</td>
<td>unclear</td>
<td>yes</td>
</tr>
</tbody>
</table>

Bachelor Degree

<table>
<thead>
<tr>
<th>FC</th>
<th>Bachelor Degree in Information Systems, Business Administration, Information Technology, other, none</th>
<th>Bachelor Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Information Systems</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>Business Administration</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>Information Technology</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>other</td>
<td>yes</td>
</tr>
<tr>
<td>5</td>
<td>none</td>
<td>no</td>
</tr>
</tbody>
</table>
Using DMN to model Decision Logic
Conclusion

Modeling knowledge processes includes

♦ Model Process Flow → BPM
♦ Model Cases → ACM
♦ Modeling business logic → Decisions

in an integrated environment

The modeling language was developed in adoxx.org
University of Applied Sciences and Arts Northwestern Switzerland

School of Business
MSc in Business Information Systems

Prof. Dr. Knut Hinkelmann
Dean
Postal address: Riggenbachstrasse 16, CH-4600 Olten
Office: Von Roll-Strasse 10, CH-4600 Olten
T +41 62 957 23 01  M +41 78 896 84 24
knut.hinkelmann@fhnw.ch  www.fhnw.ch/business