A Role-Based Approach for Modeling Flexible Business Processes

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Outline

Motivation
Approach’s core
Delegation
Constraints
Conclusion and future work

Motivation

"BP is a set of one or more linked procedures or activities that collectively realize a business objective or policy goal, normally within the context of an organizational structure defining functional roles and relationships." [WfMC,95]

Techniques for modelling BP:
- Input-process-output, Conversation-based, System thinking and system dynamics, Constraint-based representations, ...
- Techniques based on role modelling ➔ more expressive

For what reasons?

Highlight the actors’ responsibilities

Reflect the organisational structure ➔ Support of SOD principle

Better understand the way of assigning responsibilities to actors
Flexibility through roles

Meeting requirements of flexibility

Taking advantage of the concept of roles

The capacity to make a compromise between

Satisfying rapidly + easily business requirements in term of adaptability when changes occur

Keeping effectiveness of BPs

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The meta-model of our approach

Organizations are structured as networks of BPs in order to achieve business goals.

Associating roles with missions rather than with operations

Examples of situations of change

A new organization is set up and it proves to be necessary to distribute the responsibilities of each actor differently.

A responsibility has to evolve

Classical approaches

Limits: time consuming & risk of error.

# quick reactions to change

Our approach

- Checking only some mission-to-role assignments
  - Actors keep their roles, with new assigned responsibilities
- Checking only some operation-to-mission assignments
  - Roles keep their missions, with new assigned operations.

Our approach allows adaptation with functional and operational changes easily, rapidly and with reduced errors.
Associating BP with missions rather than with operations

Other aspect of flexibility:

- BP is relied to missions rather than operations.
- In a given process instance, a mission should be able to be performed by selecting one of the roles provided.
- Instead of defining an order and the operations involved in the process, we have only to precise missions that are responsible for BP achieving.

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Delegation (1)

**Motivation:**

- In a changing environment making inapplicable some predefined conditions actors can not always act as predefined
  - Unforeseen circumstances: unplanned absences, illness, leaves
  - This require substituting users.
- However: Companies have to better and quickly satisfy customer requirements.
- Then, in order to increase actors’ autonomy, delegation mechanisms have to be incorporated.

Delegation (2)

Delegation of roles’ actor to other actors is insufficient

- 3 units of delegation:
  - Roles
  - Missions
  - Operational goals
- 3 levels of delegation granularity:
  - Actor-to-actor
  - Actor-to-role
  - Role-to-role delegation
- A flexible delegation model, providing multiple forms of delegation, and supporting flexible role, missions and operational goal level delegation, is needed.
Facets of delegation

- **Duration**: enum {Temporal, Permanent}
- **Level of abstraction**: enum {Instance, Model}
- **Transitivity**: boolean {Y, N}
- **Depth**: enum {Limited, Unlimited}
- **Unit of delegation**: enum {Role, Mission, Operational goal}
- **Totality**: enum {Total, Partial}

Examples

<table>
<thead>
<tr>
<th>Actor</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane</td>
<td>Customer</td>
</tr>
<tr>
<td>John</td>
<td>Agent</td>
</tr>
<tr>
<td>Maria</td>
<td>Loan manager's assistant</td>
</tr>
<tr>
<td>Smith</td>
<td>Financial responsible</td>
</tr>
<tr>
<td>George</td>
<td>Loan manager</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role</th>
<th>Mission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>To submit a loan request</td>
</tr>
<tr>
<td>Agent</td>
<td>Loan request handling</td>
</tr>
<tr>
<td>Loan manager</td>
<td>Loan Handling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mission</th>
<th>Operational Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan Handling</td>
<td>Preparing the loan financial evaluation</td>
</tr>
<tr>
<td>Preparing the offer</td>
<td>Drafting the offer</td>
</tr>
</tbody>
</table>

Cases of role level delegation:
- Case 1: George wants to delegate his role “loan manager” to Maria.
- Case 2: George wants to delegate only the mission “Loan handling” to Maria.

Cases of mission level delegation:
- Case 3: George wants to delegate “Preparing the offer” to Maria and “Drafting the offer” to John.
- Case 4: George wants to delegate only the financial evaluation” to Smith.

Cases of operational-goal level delegation:
- Case 5: George wants to delegate “Preparing the offer” to Maria and “Drafting the offer” to John.

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- **Motivation**
- **Approach’s core**
- **Delegation**
- **Constraints**
- Conclusion and future work

Constraints on the relationships defining flexibility

- The capacity to make a compromise between satisfying rapidly + easily business requirements in terms of adaptability when changes occur and keeping effectiveness of products and services provided by BPs.

Constraints applied to relationships between the concepts of our approach’s core, constraints related to delegation.
Constraints on the relationships defining flexibility

Constraints assuring separation of duties (SOD):
- Mutually disjoint user-to-role assignments with respect to sets of roles.
- Mutually disjoint mission-to-role assignments with respect to sets of roles.

We identify also:
- BP Instance dependent SOD
- BP Instance independent SOD

Constraints can apply to:
- Actor-to-role, mission-to-role and operational-Goal-to-mission assignments.
- Processes and took-part-in and participates relationships associated with a BP.

Constraints on delegation

Delegation:
- It can successfully deal with almost all unforeseen circumstances
- It also have the potential to lead to chaos if applied incorrectly and excessively
- Constraints = mechanisms limiting undesirable delegation actions.
  - Actor’s competence: a loan manager could be allowed to delegate the mission "validate a loan offer" to his assistant but not to a financial responsible.
  - Multi-level delegation
  - Transitive delegation

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Conclusion et perspectives

What we have seen:

- BP flexibility through roles
- Concept of mission
- Issues related to delegation and constraints

Future work

- Delegation
  - Managing delegation:
    - How to distinguish between delegable and non-delegable roles and missions?
    - How delegation can be revoked?
    - Delegation authority should be managed by whom?
  
- Delegation across organizational boundaries
  - A comprehensive flexible delegation model for BP would be to have defined in future work.

- Constraints in delegation
  - Separation-of-duties in actor-to-actor, actor-to-role and role-to-role delegation

- BP monitoring
- Inheritance relationships

Thank you

Appendix
Relationship Delegator Delegatee Unit of delegation The relationship means that:

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Delegator</th>
<th>Delegatee</th>
<th>Unit of delegation</th>
<th>The relationship means that:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delegator role</td>
<td>Actor</td>
<td>Role</td>
<td>George can delegate his role “loan manager” to Maria</td>
<td></td>
</tr>
<tr>
<td>Delegator mission</td>
<td>Actor</td>
<td>Mission</td>
<td>George can delegate the mission “Loan handling” to Maria</td>
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<tr>
<td>Delegator goal</td>
<td>Actor</td>
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<td>George can delegate the goal “Preparing the offer” to Maria</td>
<td></td>
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<td>Delegator role</td>
<td>Actor</td>
<td>Role</td>
<td>George can delegate any role “loan manager” to any actor who is able to play “loan manager”’s assistant</td>
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With respect to the taxonomy proposed in [G.Regev, P.Soffer, R.Schmidt]

- **Abstraction level of change**
  Changes in roles, missions, and operational goals can be done at the BP type and instance level.

- **Subjects of change**
  The subject of change can be associated with organisational, functional, behavioural and operational perspectives.

- **Properties of change**
  - **Duration of change:**
    - Temporal / permanent delegation → temporal / permanent changes.

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**Modelling BPs using roles …**

**Role based approaches:**

- **Roles:** “Swim-lines”
  Sets of ordered activities
  - **Skills:**
    - defining a well structured order for executing activities accesorizes rigidity
  - **Tools and materials:**
    - set of actions + sequential components + tools and materials that a specialist needs to perform the actions

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A process = a mapping of roles and missions (with respect to constraints).

A BP instance = a mapping of actors and missions (with respect to constraints).

A mission can be held by several roles in several contexts for flexibility purposes.