



# A Role-Based Approach for Modeling Flexible Business Processes

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## Outline

- ◆ Motivation
- ◆ Approach's core
- ◆ Delegation
- ◆ Constraints
- ◆ Conclusion and future work

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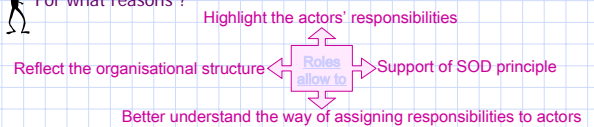
## Motivation

“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”. [WIMC,95]

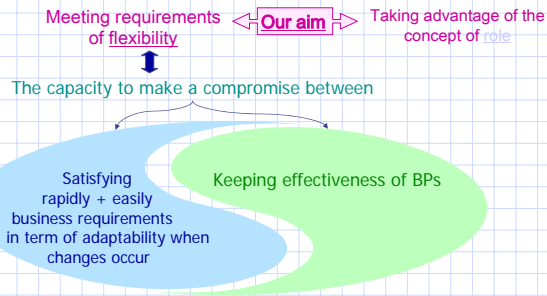
- ◆ Techniques for modelling BP:
  - Input-process-output, Conversation-based, System thinking and system dynamics, Constraint-based representations, ...
  - Techniques based on role modelling → more expressive



For what reasons ?



## Flexibility through roles



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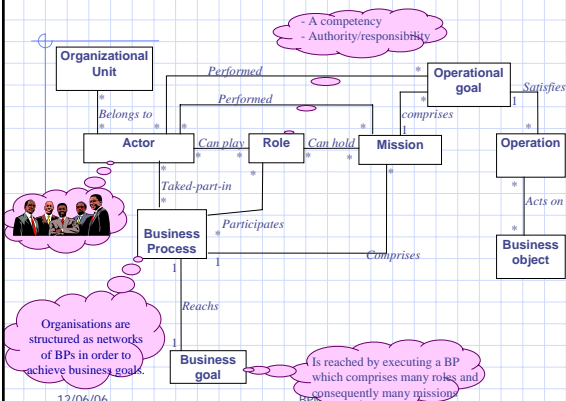
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## The meta-model of our approach



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## 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 Roles ↕ Operations	Checking all the operation-to-role assignments. <b>Limits</b> : time consuming & risk of error. ≠ quick reactions to change	
Our approach Roles ↕ Missions ↕ Operations	- 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.

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## Associating BP with missions rather than with operations

Other aspect of flexibility:

- ◆ BP is related 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



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## 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.

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## 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}

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## Examples

Actor	Role
Jane	Customer
John	Agent
Maria	Loan manager's assistant
Smith	Financial responsible
George	Loan manager

Role	Mission
Customer	To submit a loan request
Agent	Loan request handling
Loan manager	Loan Handling

Mission	Operational Goal
Loan request handling	Registration of the loan request
	Preparing the loan financial evaluation
	Evaluating the conditions
Loan Handling	Preparing the offer
	Drafting the offer

### Cases of role level delegation :

- Case 1 : George wants to delegate his role "loan manager" to Maria

### Cases of mission level Delegation

- Case 2 : George wants to delegate only the mission "Loan handling" to Maria

### Cases of operational-goal 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 preparing the financial evaluation" to Smith

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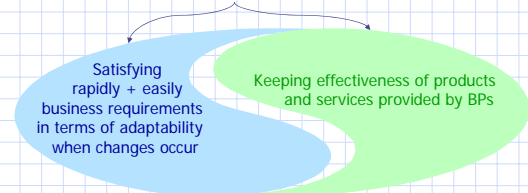
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## Constraints on the relationships defining flexibility

The capacity to make a compromise between



An employee should not approve his own loan request.

- ◆ Constraints applied to relationships between the concepts of our approach's core,
- ◆ Constraints related to delegation.

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## 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 dependant SOD*
- *BP Instance independent SOD*

### ◆ Constraints can apply to:

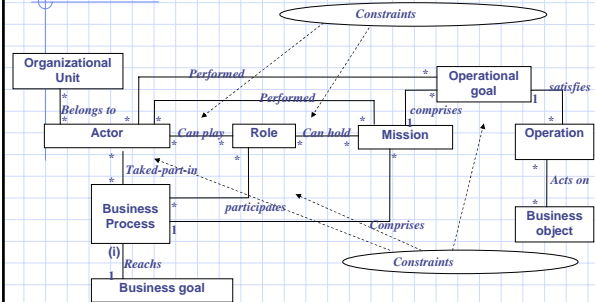
- *Actor-to-role*, *mission-to-role* and *operational-Goal-to-mission assignments*.
- *Processes* and *taked-part-in* and *participates* relationships associated with a BP.

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## Constraints on the relationships between concepts of the approach's core



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## 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 :	Example – Figure 2
Actor-Can-delegate-Role-to-Actor	Actor	Actor	Role	an actor $a_1$ can delegate a role $r$ to an other actor $a_2$	George can delegate his role "loan manager" to Maria
Actor-Can-delegate-Mission-to-Actor	Actor	Actor	Mission	an actor $a_1$ can delegate a mission $m$ to an other actor $a_2$	George can delegate the mission "Loan handling" to Maria
Actor-Can-delegate-goal-to-Actor	Actor	Actor	Operational goal	an actor $a_1$ can delegate a goal $g$ , to an other actor $a_2$ .	George can delegate "Preparing the offer" to Maria
Actor-Can-delegate-Role-to-Role	Actor	Role	Role	an actor $a$ can delegate a role $r_1$ to an other role $r_2$ , e.g. to any actor being able to play $r_2$ .	George can delegate his role "loan manager" to any actor who is able to play "loan manager's assistant"
Actor-Can-delegate-Mission-to-Role	Actor	Role	Mission	an actor $a$ can delegate a mission $m$ to a role $r$ , e.g. to any actor being able to play $r$ .	George can delegate "Loan handling" any actor who is able to play "loan manager's assistant"
Actor-Can-delegate-Goal-to-Role	Actor	Role	Operational goal	an actor $a$ can delegate an operational goal $g$ to a role $r$ , e.g. to any actor being able to play	George can delegate "Preparing the offer" to any actor who is able to play "loan manager's assistant"
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Relationship	Delegator	Delegatee	Unit of delegation	The relationship means that :	Example – Figure 2
Role-Can-delegate-Role-to-Role	Role	Role	Role	any actor being member of a role $r_1$ can delegate an other role $r_2$ to any actor $a$ member of a third role $r_3$	Any actor playing "loan manager" can delegate this role to any actor who is able to play "loan manager's assistant"
Role-Can-delegate-Mission-to-Role	Role	Role	Mission	any actor being member of a role $r_1$ can delegate a mission $m$ to any actor $a$ member of a second role $r_2$	Any actor playing "loan manager" can delegate "Loan handling" to any actor who is able to play "loan manager's assistant"
Role-Can-delegate-Goal-to-Role	Role	Role	Operational goal	any actor being member of a role $r_1$ can delegate an operational goal $g$ to any actor $a$ member of a second role $r_2$	Any actor playing "loan manager" can delegate "Preparing the offer" to any actor who is able to play "loan manager's assistant"
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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 :

Role-Interaction-Networks [12] → Roles ⇔ "Swim-lines"  
Role-Activity-Diagram [9] → Roles ⇔ Sets of ordered activities

Limits : defining a well structured order for executing activities accentuates rigidity

[1] → Roles ⇔ set of actions  
+ sequential constraints  
+ tools and materials that a specialist needs in his craft to perform the actions.

Limits : it does not allow a sequence of actions to be performed by actors having different competencies, according to the situations in hand.

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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.