

# Using data-object flow relations to derive control flow variants in configurable business processes

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# Table of Contents

- 1 Introduction
- 2 Background
- 3 Variability Modeling Approach - bpFM
- 4 Case Study: EU Project Reporting
- 5 Related Works
- 6 Conclusions and Future Work

# Introduction

Business Processes need to be as **flexible** as possible to support a continuously evolving scenario

We contribute with a **novel modeling approach** to support **flexibility** of Business Processes considering **data**

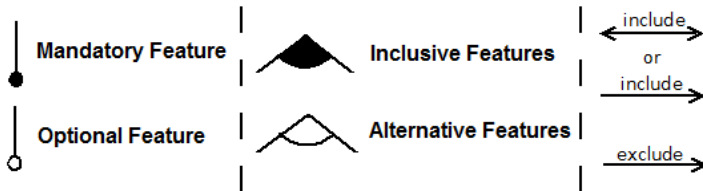
The approach permits to deal with large collections of Business Processes variants thanks to the **integration of Business Process** and **Feature Model**

# Software Product Line and Feature Modeling

## Software Product Lines (SPL)

refer to methods, tools and techniques for **creating a collection of similar software systems**

**Feature Model (FM)** is a **modeling approach** emerged in the context of SPL in order to support the development of a variety of products from a common platform



Kang, Kyo C., et al. Feature-oriented domain analysis (FODA) feasibility study. No. CMU/SEI-90-TR-21. Carnegie-Mellon University of Pittsburgh PA Software Engineering Institute, 1990.

# The bpFM approach to variability modeling

The approach we propose **mixes** the characteristics and objectives of the two different modeling context (BP e FM)

To model BPs variability an extended version of FM has been introduced, named business process Feature Model (bpFM), in which the **features represent the activities characterizing a process (functional view)**. Among the activities relations are defined similarly to what is done in FODA

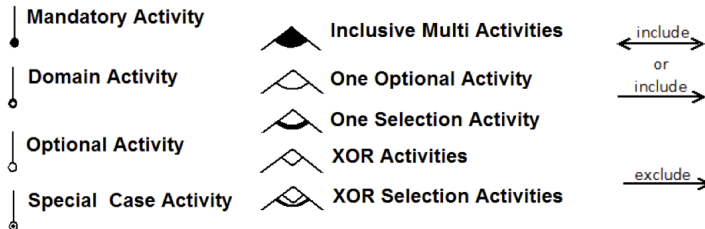
A set of **mapping rules** from bpFM to BPMN 2.0 fragments has been defined

Successively according to a specific **feature selection (configuration)** a set of fragment components of a **detailed BP skeleton** can be automatically derived

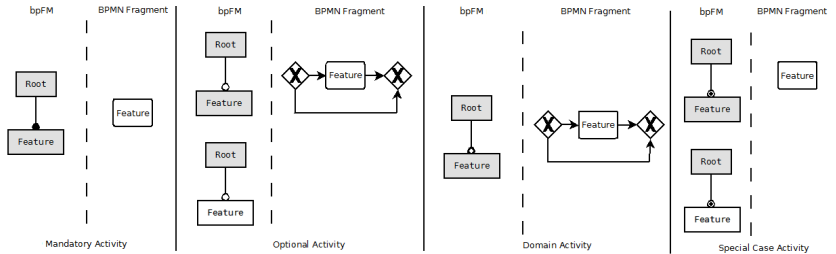
Information concerning the input and output data object related to an activity (information view) **drive** the BP variant definition

## bpFM Constrains

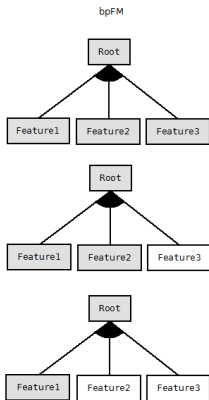
Constraints in the bpFM notation permits to specify **relations among activities** and if an activity has **to be executed or not**



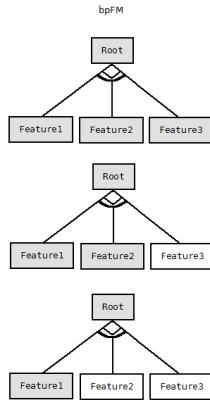
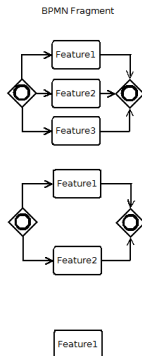
# Mapping to BPMN



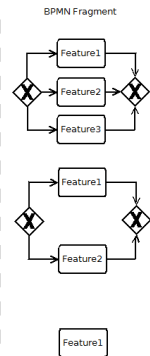
# Mapping to BPMN



Inclusive Multi Activities

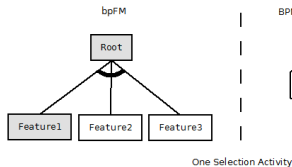
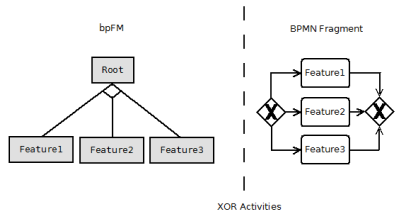
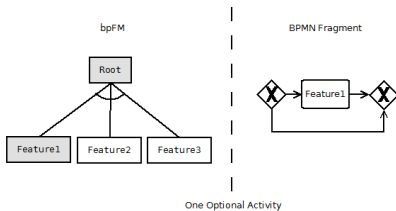


XOR Selection Activities



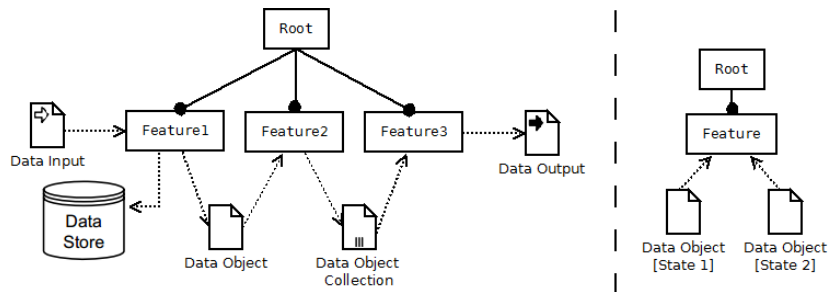


# Mapping to BPMN



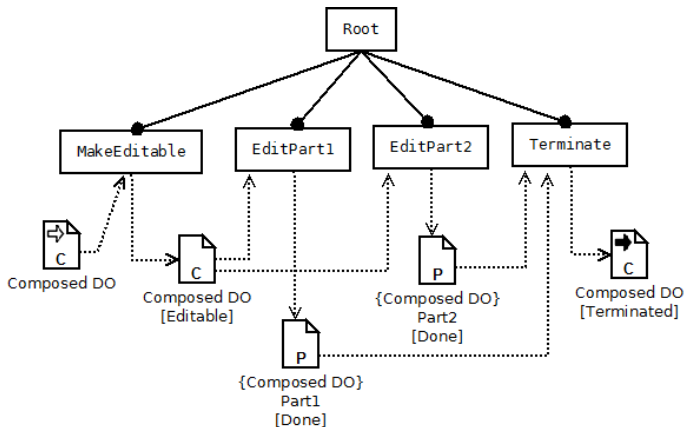
# Data Objects in bpFM

bpFM manages all types of **BPMN 2.0 data objects**, including data object states, using the same notation



## Data Objects in bpFM

bpFM introduces the notion of **composite and part of** data objects



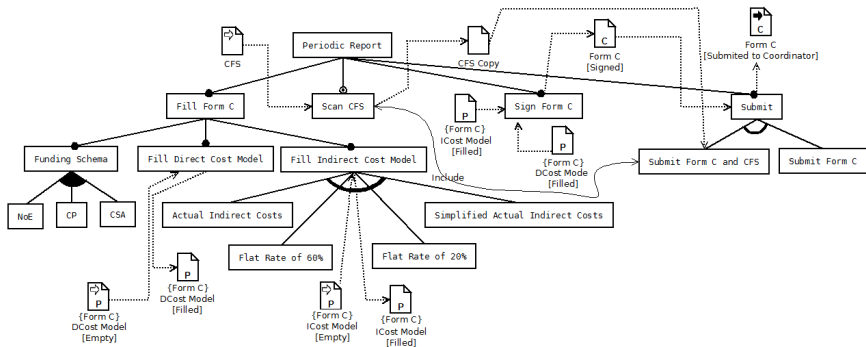
# EU Project Reporting

The participation to a EU financed project oblige the beneficiary in **budget reporting activities** as an evidence of the tasks performed within the project

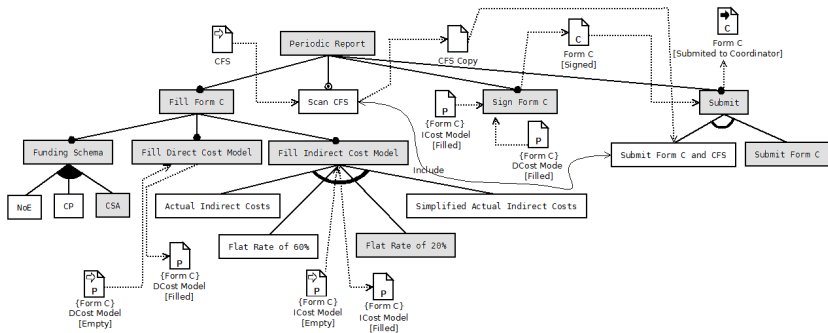
Submitting a EU project the organizations have to be aware of the **dynamic environment** in which they are working

We consider the **periodic budget reporting** Business Process

# Participant Periodic Report: bpFM model

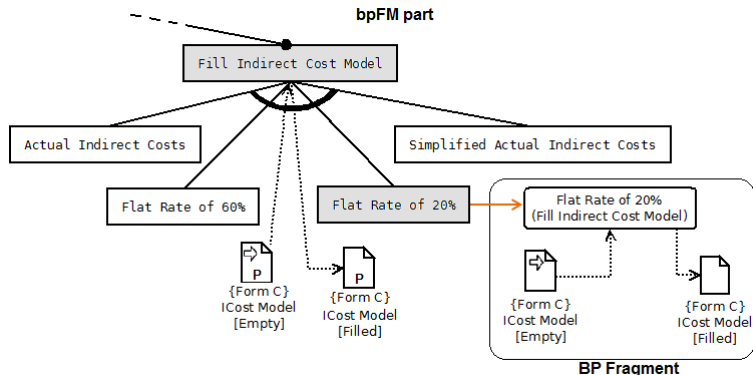


# Participant Periodic Report: bpFM configuration



## Participant Periodic Report: Mapping Example

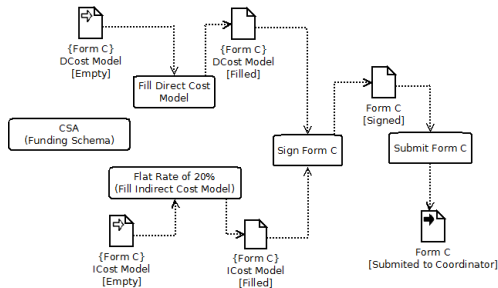
The selection of an activity (feature) results in the generation of the correspondingly BP fragment



## Participant Periodic Report: the BP skeleton

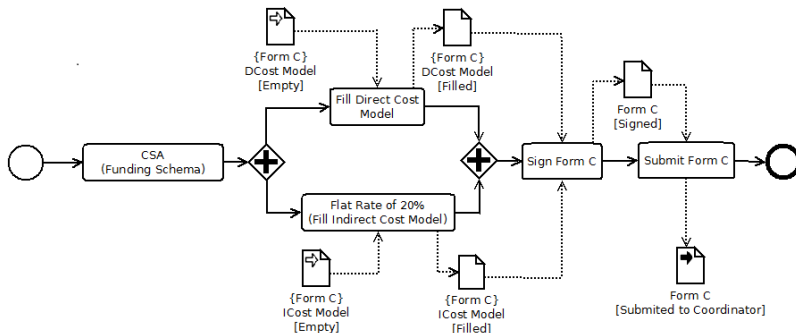
The mapping rules permits to derive set of fragment including **all the selected activities given the configuration**, as well as the definition of some behavioral constraints

The BP variant is finally obtained including all the behavioral constraints





## Participant Periodic Report: a BP Variant



## Related Works

- **Configurable integrated EPC**, from this language we took inspiration for the management of data object in bpFM
- **PESOA** approach, it introduces abstract tasks named variation points
- **BP and FM combination** is emphasize in few papers where basic version of FM is used and manual mapping between FM and BP is included

La Rosa, Marcello, et al. "Beyond control-flow: Extending business process configuration to roles and objects." Conceptual Modeling-ER 2008. Springer Berlin Heidelberg, 2008. 199-215.

Schnieders, Arnd, and Frank Puhmann. "Variability Mechanisms in E-Business Process Families." BIS (2006): 583-601.

Grner, Gerd, et al. "Modeling and validation of business process families." Information Systems , 38(5) (2013): 709-726.

# Conclusions

Variability needs to be more and more taken into account also in order to reduce costs. We presented an approach to model variability of BP permitting to include in a **single model many different variants of the same BP**. The approach permits to the modeler to **focus on different views** (functional, behavioral, information, ...) at different times

Adopting the approach it is possible to reduce the **complexity of managing many different variants** of a BPs. The initial experiments we conducted **provided encouraging results**.

## Future works

There are many items in the future work list, among the others:

- Continue experiments and validation
- Finalize the supporting tool chain
- Study the possible extension of the approach to consider **multi-organizational BPs**

## EU financed project Model-Based Social Learning for Public Admin. (Learn PAd)



LEARN PAd

<http://www.learnpad.eu>



Thank you!

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