Business Process Lines and Decision Tables Driving Flexibility by Selection

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Abstract. A major challenge faced by organizations is to better capture business strategies into products and services at an ever-increasing pace as the business environment constantly evolves. We propose a novel methodology base on a Business Process Line (BPL) engineering approach to inject flexibility into process modeling phase and promote reuse and flexibility by selection. Moreover we suggest a decision-table (DT) formalism for eliciting, tracking and managing the relationships among business needs, environmental changes and process tasks. In a real case study we practiced the proposed methodology by leveraging the synergy of feature models, variability mechanisms and decision tables. The application of DT-based BPL engineering approach proves that the Business Process Line benefits from fundamental concepts like composition, reusability and adaptability and satisfies the requirements for process definition flexibility.

Keywords: business process management, business process modeling, business process line, feature model, variability mechanisms, decision table.

1 Introduction

Business processes and services are at the heart of an ongoing “silent revolution”. A major challenge faced by organizations in today’s environment is to monitor a constant evolution of business environment and better capture business strategies into products and services at an ever-increasing pace as the business environment evolves. At the same time, organizations distributed by space, time and capabilities are increasingly pushed to exploit synergies by integrating their business processes in order to produce new value-added products and services. Also mergers or acquisitions can entail integration of different processes, reuse of parts of the process to be discarded, inclusion of parts of other processes and so on.

Both the process evolution due to internal and external factors, the Business Process Management (BPM) paradigm stresses the importance of integrating whole process rather than simply integrate data or applications [1, 2]. Also, the process wave initiated by Hammer and Champy [3] led to the awareness of business process models as indispensable artifacts to drive business management and evolution. However, traditionally, BPM systems were used to support static business processes, in sense of processes which do not change frequently. This has limited the scope of this
Business process modeling management systems and languages that are able to describe and unroll dynamically changing processes are today necessary.

In this scenario, in our research work, we face how to allow a business process to evolve in an agile manner by injecting flexibility into process definition, so we approach the problem of flexibility from a modeling perspective. Flexibility is the adaptation to a changing environment. However, adapting process models or its instances during their execution fit only stable processes in expecting changes domain. In order to provide the capacity to anticipate the change at modeling-time, we argue that a more systemic view of business process variability is necessary to handle the problem ‘in the large’ and we suggest capturing changes in a product-line engineering approach based on selection and design of commonalities and variations. Seeing the duality that exists between products and processes, we believe that lines of business processes could beneficially be handled as software product lines: we propose to model business processes in a Business Process Line (BPL) able to elicit commonalities as well as variant components in order to capture process variability and promote reuse and flexibility needed in a constantly changing business environment.

For this purpose, after a feature-oriented domain analysis as typically in software product line development, our proposed methodology intends to inject appropriate variability mechanisms in process modeling in order to enable flexibility by selection. Variability mechanisms [4] takes inspiration from modularity concept in the object oriented paradigm to establish a hierarchical construction of the business process modeling: so it can be possible to model business processes with inheritances, encapsulations, extensions, parameterizations and so on. The resultant business process model will benefit in terms of flexibility by leveraging of fundamental concepts like composition, reusability and adaptability and offer ease of change to analysts.

However, in order to anticipate the process changes, it is essential to elicit all possible process characteristics and not to leave degrees of freedom in process execution, so we suggest to track and manage the considerable amount of process parameters through a decision-oriented paradigm: we introduce the use of decision tables (DTs) to acquire, formalize and reuse all the emerging decision points during business process modeling. Decision tables are able to give a representation of the relationships among business needs, environmental changes and process tasks in a complete manner, without inconsistencies. These peculiarities are assured by compact overview of a large number of information, modular knowledge organization, effective verification of consistency, completeness and redundancy. Moreover, decision tables are easily maintainable by supporting the dynamic reengineering of the represented relationships. This paradigm seems to be particularly appropriate for representing knowledge intensive business processes or any kind of processes requiring flexibility.

Briefly, our research work investigates the following Research Questions (RQ):

- RQ1: How to capture and model variability in business processes in order to improve flexibility in changing environment?
- RQ2: How to elicit and manage all possible process characteristics to prevent and detect anomalies in decision points?