

Extending the EPC with Performance Measures

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ABSTRACT

The Event-Driven Process Chain (EPC) is designed for modelling business processes, but does not yet include any means for measuring the performance of a business process. Thus, we extend the metamodel of the EPC with performance measures to make them conceptually visible. The extensions are tested with an example business process.

Keywords

Business process modelling, performance measures, metamodel.

1. INTRODUCTION

The Event Driven Process Chain (EPC) is one of the most widely used Business Process Modelling Languages (BPMs). Although the EPC offers notation elements for business process goals, it does not provide elements that make performance measures visible. The goal of this paper is to address this limitation

- by extending the EPC metamodel with performance measures and, by
- providing notation elements for them.

Goal-oriented business process modelling and business process performance measurement have become important topics in research and industry. Korherr et al. [2] extended the UML 2 activity diagram with business process goals and performance measures and, provide a mapping to BPEL. List et al. [3] developed a UML 2 profile for business process modelling that captures high-level characteristics, like goals and measures, customers, and deliverables.

We extend the EPC metamodel with performance measures, and provide the following contributions:

- Performance measures make the evaluation criteria for a business process conceptually visible and,
- provide a means to quantify business process goals.

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2. EPC AND PERFORMANCE MEASURES

The EPC [4] has been developed within the framework of the Architecture of Integrated Information System (ARIS) and divides complex process models into separate views, in order to reduce the complexity. The views focus on functions, data, and the organisation, and can be handled independently as well as related to each other. The EPC metamodel extended with performance measures is described in Figure 1 in UML 2.0 class diagram notation. An EPC consists of functions, events, control flow connectors, logical operators, and additional process objects. A more detailed description of the EPC can be found in [1].

We extend the EPC metamodel by introducing a new view, the *Measure View*; shown in Figure 1 and highlighted in grey. It contains two core concepts, namely *Measure* and *Process Goal*. The process goal itself is a part of the EPC, and describes the specific intension of a business process. Each goal is quantified by at least one measure, and a goal can be refined by one or more sub goals. A measure is an abstract metaclass and is connected with one or more *Measure Flow Connectors*. It can be classified and implemented as *Quality*, *Cost* or *Cycle Time*. The quality can be expressed e.g., by a low number of complaints or a high customer satisfaction. Cost represents the expenses a business process requires for instance for its execution. Cycle time presents a time based measure and defines the processing duration of a business process instance, or part of it. It can be specialised as *Working Time* or *Waiting Time*. Working time represents the actual time a business process instance is being executed by a role. Waiting time shows the time the process instance is waiting for further processing. Quality and cost are in contrast to the cycle time often more focused on the type level of a process, as the required data is often not available on instance level.

Figure 2 illustrates the relationship between goals and measures in a so called goal measure tree. A goal can have several sub goals, and each goal has at least one measure. An example of the goal measure tree is shown in Figure 2. The main process goal is *Good Process Performance*. This goal has three sub-goals: *Low Processing Costs*, *Short Process Duration*, and *High Customer Satisfaction*. Furthermore each goal is refined by measures. The goal low processing costs is fulfilled, when the *Average Processing Costs per Month* are under 15 Euros. The measure cycle time is split up into two sub-cycle times and indicates that the process duration has to be less than four days. Moreover, the goal high customer satisfaction is achieved, if the *Average Percentage of Complaints per Month* is less than five percent.

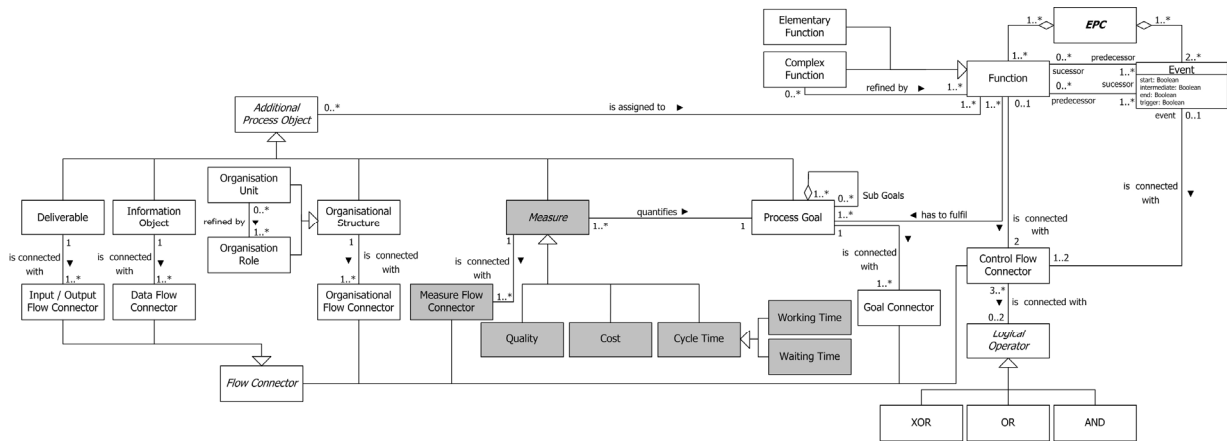


Figure 1. Extended EPC metamodel with performance measures

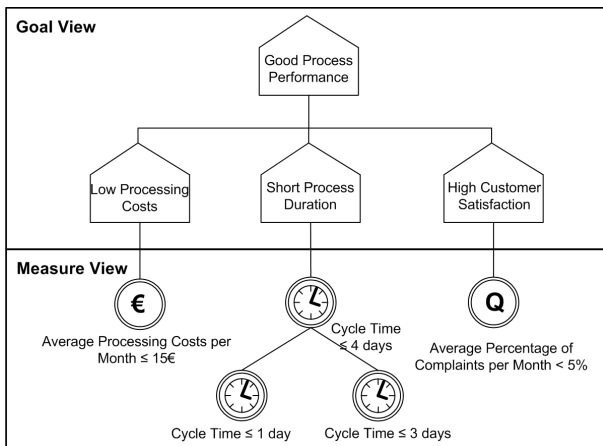


Figure 2. Goal Measure Tree

3. EXAMPLE

We demonstrate the practical applicability of the extension of the EPC with performance measures described in Figure 1 with a high-level business process of an insurance company, the *Processing of Automobile Claims Business Process* (Fig. 3). For the sake of simplicity, in Figure 3 and 4 the first and the second hierarchy levels of the business process are shown, while the fine-grained levels of the business process showing the atomic activities are not described.

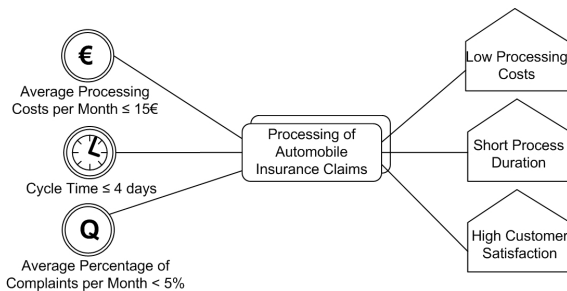


Figure 3. First hierarchy level: Automobile Claims BP

The overall goal of *Processing of Automobile Insurance Claims* is to fulfil the process goals *High Customer Satisfaction*, *Short Process Duration* and *Low Processing Costs*. The process has to meet three measures, costs, cycle time and quality. The average processing costs per month have to be 15€ maximum, the number of complaints should not exceed five percent and, the cycle time should be not over 4 days.

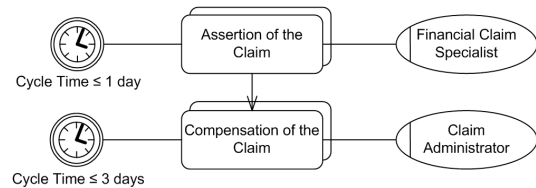


Figure 4. Second hierarchy level: Automobile Claims BP

At the second hierarchy level (Fig. 4) the organisational role *Financial Claim Specialist* is responsible for *Assertion of the Claim*. The organisational role of the *Claim Administrator* is responsible for the *Compensation of the Claim*. Furthermore assertion of the claim has to fulfil its tasks within a cycle time of one day, and compensation of the claim within three days.

4. ACKNOWLEDGMENTS

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