

# Unified Patterns to transform business rules into an event coordination mechanism[1]

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**Abstract.** Business rules define and constrain various aspects of the business, such as vocabulary, behavior and organizational issues. Enforcing the various rules of the business in information systems is not straightforward, because different mechanisms exist for the transformation of business rules into model driven implementations, leading to partial solutions for process management, data constraints, audit constraints, etc. In this paper, we examine if and how business rules, not only data rules, but also process rules, timing rules, authorization rules, etc., can be expressed in SBVR and translated using patterns into a more uniform event mechanism, such that the event handling could provide an integrated enforcement of business rules of many kinds.

**The need for a unified framework** Business rules should be on the one hand comprehensible so that they can be understood by business people and on the other hand formal so that they can be enforced by information systems. The Semantics of Business Vocabulary and Business Rules (SBVR), a new standard for business modeling within the Object Management Group (OMG), has such property.

SBVR is a language to describe the structure and the meaning of vocabulary and business rules in terms of formalized statements about the meaning. This also makes SBVR a suitable base language for defining process-aware rules, but it does not contain a vocabulary with process related concepts such as agents, activities, process states and events. To this end we extended SBVR with a vocabulary for expressing process-related concepts, called the EM-BrA<sup>2</sup>CE Vocabulary.

**Business Rule Types** SBVR extended with the EM-BrA<sup>2</sup>CE Vocabulary allows us to define three groups of business rules: (1) Data rules constrain particular manipulations of data. (2) Control-flow rules constrain the execution of activities. (3) Organizational aspects constrain the authorization to perform and see particular activities.

**Patterns for transforming business rules into event rules** Enforcing the different types of rules of the business in information systems is not straightforward, different mechanisms exist for the (semi-)automatic transformation of

<b>Control-Flow Rule: Precedence of activities</b>	
<b>Business Rule Template:</b>	<Activity2> <b>may ... only after</b> <Activity1> (Conditional allowance)
<b>Business Rule Example:</b>	<ul style="list-style-type: none"> <li>• Activities: <ul style="list-style-type: none"> <li>○ Activity1: <u>Trainee attends car classes</u></li> <li>○ Activity2: <u>Trainee takes practical session</u></li> </ul> </li> <li>• Business Rule: <ul style="list-style-type: none"> <li>#4: <u>A trainee may take a practical session only after that trainee has attended car classes</u></li> </ul> </li> </ul>
<b>Translation to Event Rules:</b>	On start (<Activity2>) : if not completed (<Activity1>) then <i>notify</i> (Rule #)
<b>Translation to Event Rules Example:</b>	On start ( <u>trainee takes practical session</u> ) : if not completed ( <u>trainee attends car classes</u> ) then <i>notify</i> (#4)

Fig. 1. Control-Flow rule: Precedence of Activities

various business rule types, leading to partial solutions for data constraints, process management and audit constraints. Event handling provides a more uniform enforcement of business rules of many kinds, not only data rules, but also control-flow rules and organizational rules.

To this end, we provide a pattern mechanism to transform SBVR business rules into event-driven enforcement rules and notifications. For each type of rule we define a general template. The rule template generates a set of Event-Condition-Actions rules once a business rule is defined. The Event-Condition-Action rules are equivalent to the SBVR Business rules but have the advantage that they make clear when they have to be checked. Example templates for Data aspects(integrity constraints, derivations rules), Control flow aspects(precedence of activities (see figure 1)) and organizational aspects(Authorization rules) are provided.

**Conclusion** By transforming the business rules into Event-Condition-Action rules we provide a more uniform event mechanism, such that event handling can provide an integrated enforcement of business rules of many kinds.

## References

1. De Roover, W., Vanthienen, J.: Unified patterns to transform business rules into an event coordination mechanism. In: 4th International Workshop on Event-Driven Business Process Management Proceedings. (2010) 61–73