

Checking Business Process Modeling Guidelines in Apromore

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Abstract. We present the integration of BEBoP - understandability vErifier for Business Process models, into the Apromore open-source process analytics platform. Given a BPMN model the tool allows one to verify which understandability modeling guidelines such as layout conventions are violated by the model. Such guidelines are rules that a model designer should follow to guarantee that the designed model is easy to understand by relevant stakeholders. Given the variety of stakeholders that need to interpret these models, and considering the pivotal function that process models play within organizations, understandability becomes a fundamental quality requirement that needs to be taken into account by designers. The tool provides model designers with textual and graphical representations of which understandability guidelines are violated. Designers can then decide to repair models in such a way to guarantee a higher degree of understandability.

1 Significance and Maturity

The literature shows that business process modeling has been identified as an important phase in BPM [8], and the benefits of its use in practice are well recognized [3]. At the same time the quality of models resulting from the modeling phase is critical for the success of an organization [7]. In particular, the designed models must fit with the reality, and they must be considered understandable by all the stakeholders interested in the information they convey. Many contributions can be found in the literature which propose modeling guidelines to guarantee model understandability. However those guidelines are scattered among many different works [5, 10, 11], which in general do not use a homogeneous template to describe them [6]. In [2] the authors tried to overcome those issues by collecting understandability guidelines for modeling business processes from the literature, synthesizing and presenting them in a homogeneous format; for each guideline they provide a template including the following fields: an *ID* and a *Name* to uniquely identify the guideline, a *Description* to provide an explanation of the guideline, *References* to report the original guidelines source allowing the users to access additional materials about the guideline itself, *Metrics* and *Thresholds* to assess the adherence of a model to a guideline, an *Example* to graphically display the application

of the guideline to a practical scenario, and to highlight the differences between good and bad modeling practices. The result is a list of 50 guidelines [2] which have been organized into categories. *General* includes guidelines that impact on different aspects of the overall BPMN modeling practice. *Notation* includes guidelines on the usage of the BPMN syntax. *Labeling* includes guidelines for the assignment of proper labels to BPMN elements. *Patterns* includes guidelines that suggest a specific arrangement of BPMN elements. *Appearance* includes guidelines for a clear presentation of the BP model. In order to validate these guidelines the authors submitted a questionnaire to the Public Administrations and the Academic contexts targeting employees, students, researchers, professors and managers. From the obtained answers they wanted to deduct if the guidelines were perceived being useful and if models designed following the guidelines would be perceived as more understandable.

Although commercial tools are available that check a considerable number of guidelines, no open source tool existed for this task. The authors of [2] proceeded with their work developing an open-source tool called BEBoP⁴ to automatically verify understandability modeling guidelines over BPMN models. This enables BPMN models designers to obtain feedback on the level of understandability of their designed models. BEBoP⁵ has been developed in the context of the European project Learn PAd⁶ and allows the automatic checking of understandability guidelines over BPMN models. BEBoP is developed as a Web service, and its graphical user interface can be accessed by users through any Web browser.⁷ The service can be accessed by other software through its RESTful interface, and the tool can be integrated as a plug-in into other existing tools, and extended if required. The tool takes as input a BPMN model and allows one to automatically verify 34 of the 50 guidelines over the selected model; these 34 guidelines are the ones that have an associated metric and thresholds, or refer to the presence/absence of BPMN elements and their associated labels. For each guideline, the tool implements an algorithm for its check.

Several commercial tools exist to verify quality aspects of BP models. Among such tools, we have Signavio 10.1,⁸ No Magic MagicDraw 18,⁹ Bizagi Process Modeler 3.0¹⁰ and Camunda Community Edition.¹¹ All these tools provide business process model editing capabilities besides the ability to check understandability guidelines. With respect to the 50 guidelines identified in [2], BEBoP allows one to automatically verify 34 guidelines, Signavio 22, MagicDraw 8, Bizagi 7, and Camunda 5.

Our tool has been tested over the European Project Budget Reporting scenario (EPBR), which was a case study for Learn PAd. EPBR refers to a set of processes

⁴ BEBoP source code: <https://goo.gl/zrd6z9>

⁵ BEBoP has been developed by the CNR Institute of Pisa in collaboration with the University of Camerino

⁶ Learn PAd website: <http://www.learnpad.eu/>

⁷ BEBoP web service interface: <https://goo.gl/8XEi6s>

⁸ <http://www.signavio.com/products/process-editor/>

⁹ <http://www.nomagic.com/products/comeo-business-modeler.html>

¹⁰ <http://www.bizagi.com/en/products/bpm-suite/modeler>

¹¹ <https://camunda.org/download/modeler/>

performed by public administrations that received a research grant from the European Union.

One tool for managing business processes that has been developed in the BPM community, and that is under a constant growth, is Apromore¹² [4]. Apromore is the result of over seven years of ongoing development and is currently in version 5.0. The platform is implemented via a service-oriented architecture and deployed as a Software as a Service. The technologies used in Apromore combine Spring as the Java development framework, Maven as the dependency manager, OSGi as the plugin architecture, EclipseVirgo as the OSGi-based application server, and ZK as the AJAX front end. The chosen technologies allow Apromore to be an extensible framework, where new plugins can be easily added to an ecosystem of advanced business process analytics capabilities. Since the utility of having guidelines for modeling understandable business processes is confirmed by the literature [1, 9] we decided to introduce this functionality into the Apromore repository by an integration with the BEBoP web service.

2 BEBoP - Apromore integration

The BEBoP tool has been integrated into Apromore in the form of a plugin for “*Portal*” and another for the “*Editor*” environment. The Apromore Portal provides users with a way to navigate the model repository, having a general view over the stored models. Regarding our plugin, from the portal environment one can select a BPMN model in the *.bpnm* format from Apromore’s repository and ask for a check of the understandability modeling guidelines calling the related plugin from the “BEBoP-Guidelines Check” item under the dropdown menu named “Analyze” as shown on the left-hand side of Fig. 1. Once the user has requested the guidelines check, an additional tab in the portal is displayed reporting a list of the violated guidelines with name and description as shown on the right-hand side of Fig.1. This view allows the user to have just an overview of which guidelines are violated. For a better understanding of which are the involved elements that do not meet the guidelines, the user is asked to open the model accessing the Editor environment. The Apromore Editor allows users to create models and regarding our plugin, from the Editor model designers can ask for a check of the understandability modeling guidelines over the model they are designing. The user is prompted with a window listing the violated guidelines and the BPMN elements that violate them, as shown in Fig.2. From the figure we can notice that one element of type “Task” violates the “Activity Description” guideline which suggests designers to provide a description for each activity in the model. The window displayed to the user consists of two parts: the left part “Guidelines Violated” containing a grid with all the information about the BPMN elements violating the guidelines, and the right part “Guideline Description” displaying which guideline has been violated by which BPMN element. While the left part content is static, basically presenting the information about BPMN elements with: *label*, *type* and *id* of the element; the content on the right part dynamically changes based on which element of the grid the user selects. In this way, the name of the guideline, violated by the selected element, and its description, are displayed to the user as

¹² Apromore website: www.apromore.org

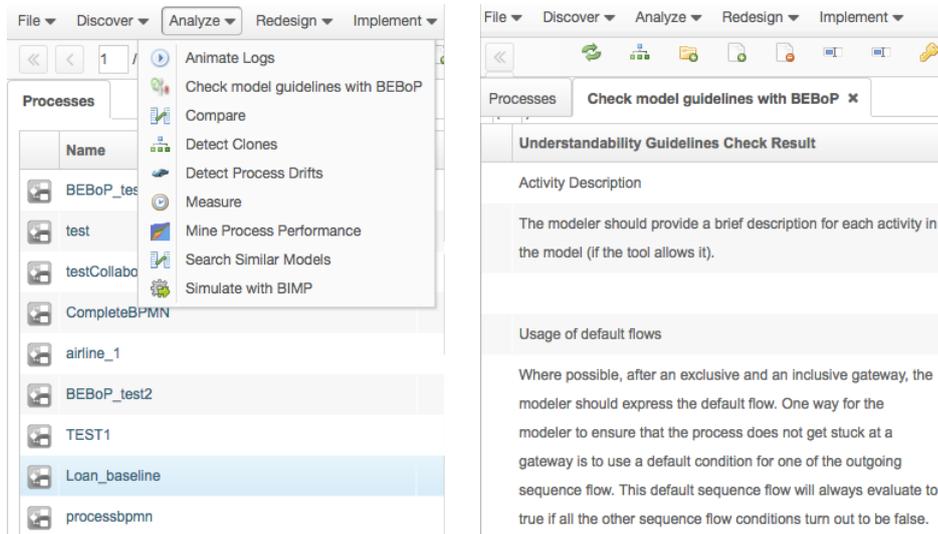


Fig. 1. BEBoP-Guidelines Portal View. Left: selection of a model and request for guidelines check. Right: extract of the resulting list of violated guidelines.

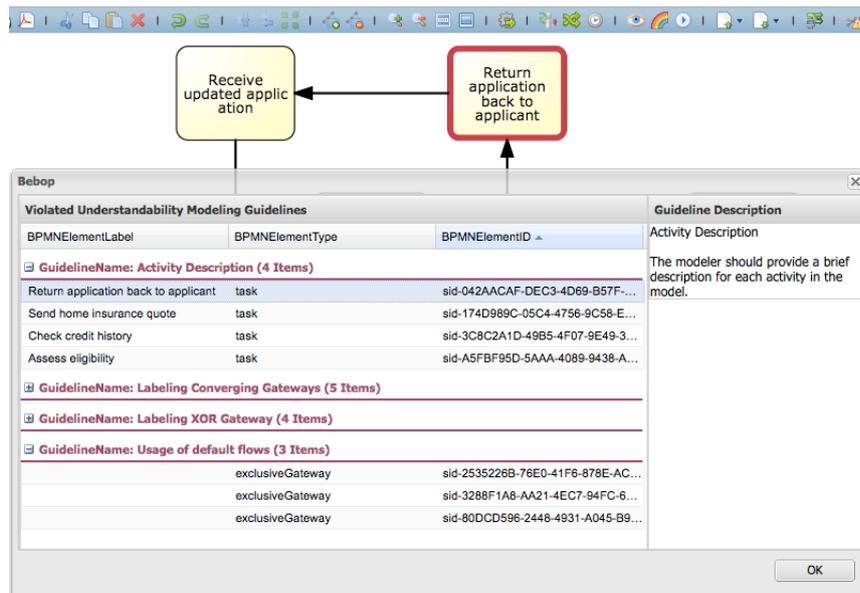


Fig. 2. Textual and graphical presentation of the guidelines on top of a BPMN model.

shown in Fig. 2. At the same time, when an elementID is selected from the grid, it is also highlighted, using the red color, in the actual graphical representation of the model. This

allows a faster recognition of the BPMN element violating the guideline and leaves to the user the possibility to correct the guideline violation.

3 Screencast and Links

A screencast is available at <https://youtu.be/8LToEahCf2Q>. This video illustrates a typical scenario where the user requires to check a BPMN model against the understandability guidelines. The BEBoP integration is embedded as a set of OSGi plugins into the online process analytics platform Apromore, which has been used for the screencast (<http://apromore.org>).

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