

WEBML MEETS BPMN

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ABSTRAKT: This article aims to put brief information about web-methods and BPMN influence, integration, joint evolution and reasons which cause these matters of fact. In the following it briefly describes how BPMN influences one of the most well-known web-method, i.e., WebML method. Further, it deals with the description how is BPMN included into WebRatio CASE tool which is primarily targeted as a tool for the support of WebML method. In the end, the Author summarizes the paper, suggests questions and discusses future directions of web-methods, especially WebML method and BPMN joint futurity.

KEYWORDS: WebML, WebRatio, BPM, BPMN, web-method, web engineering, software engineering, web modelling

1 INTRODUCTION

In the past few years the Author has been published a series of information articles about web-methods, i.e. about the software engineering methods specializing in analysis, design, development and implementation of web sites and web oriented information systems (WOIS). What's more, the author has been concerned with this issue for many years and published many information articles about origination, causation, evolution and implication of different web-methods on many local Czech conferences and seminars; we afford to refer only a few of them [1], [2] and [3], so this article is one of many of such disseminating the author's opinions in the wider scope of international as well as local expert community engaging in the web site informational modelling.

The modern WOIS targeted for enterprise or business domain are strongly intended for information support of enterprise business processes included in them. However, on the other hand, in the area of business systems the specialised business process modelling methods are used. It is evident that the ones analysing and modelling methods exist in the area of web engineering and the other methods exist in the area of business modelling. We may put down a question if there is any connection between these two types of analysing methods as well as if exist the methods and tools supporting both such different analysing and modelling approaches ever.

The rest of this paper is organized as follows. Next, in Section 2, we start off by describing how the ideas of BPMN are included in WebML method. After that, Section 3 gives the overview how is BPMN included in WebRatio CASE tool. Section 4 summarizes the paper, suggests questions and discusses future directions of web-methods and BPMN joint evolution.

2 WEBML and BPMN

WebML [4] is the most developed web-method at the present time. As stated in the Wikipedia [5].

“WebML (Web Modeling Language) is a visual notation for designing complex data-intensive Web applications. It provides graphical, yet formal, specifications, embodied in a complete design process, which can be assisted by visual design tools, like WebRatio. This method has five models: structure, derivation, composition, navigation and presentation. These models are developed in an iterative process.”

At first sight it looks like a process model is not included in the WebML concept or if you like, that any of the five different diagrams do not deals with the modelling of process domain of information systems. But, it is not true at all. The model of processes is included into a composite model of composition model and navigation model, jointly named as hypertext model in the WebML terminology. Primarily, the hypertext model is targeted towards modelling, on the one hand, the network of navigations between the pages of certain web site, and, on the other hand, the composition of particular web pages from functional units, such as data unit, multi-date unit, index unit and many others, how is in detail described in WebML hypertext diagram notation documentation. An example of simple hypertext diagram is shown in (Fig. 1, example is taken from [6]).

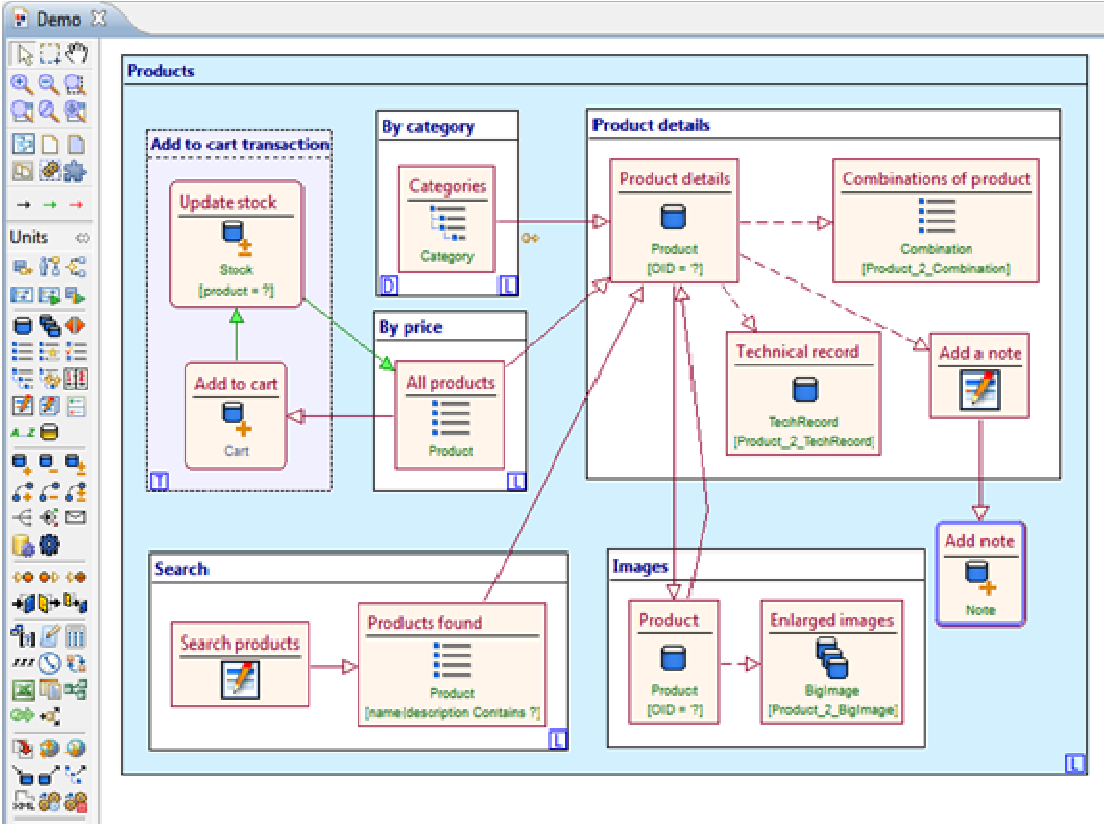


Fig. 1- WebML hypertext diagram - example

Herein we put a very brief explanation of (Fig. 1); the example demonstrates a simple web site view denoted *Product* with four pages named: *By category*, *Product details*, *Search* and

Images. All pages contain different units, for example, the page named *Images* contains the *Product* data unit and *Enlarged images* multi-data unit. But, we can also observe that there are the other units not included into any particular web page. These units are special *process* units, intended especially for data processing, but for other type of process activities as well. We can point out, for example, login or logout units. As far as concerning the data process units, be specific, *Add note*, *Add to cart* and *Update stock* units, these units are especially target for inserting, modifying and deleting information records into database. Farther, we can observe that last two data process units are included in a special area named *Add to cart transaction*. This special type of area includes data process units subjected to database transaction.

It is clear now that WebML diagram really can contain also process elements placed outside web pages on navigational paths between them. However, it has appeared that this combination of complex business logic and hypertext design of web site into one complex diagram is not a very efficient solution. Firstly, such diagram is exceedingly complex for easy understanding by developer; secondly, the process alias business portion of the system can be more easily modelled by standardized BPMN [8] notation with many advantages. In the next section we show how this idea of WebML and BPMN jointly modelling is implemented in WebRatio CASE tool.

3 WEBRATIO and BPMN

WebRatio [9] CASE tool is the one of the rarely existed CASE tools implementing the whole MDA process from beginning, i.e., from the data and process specification, to completion, i.e., to generation of the whole application. The last version 6.0 of WebRatio implements in one application both the WebML designer, and BPMN designer as well. The whole development process with WebRatio is shown in (Fig. 2, example is taken from [6]). Herein we put a very brief explanation of this outline. The WebML method, as well as, WebRatio CASE tool insists on MDD (Model Driven Development) approach, it means that all life cycle of product development is controlled by models. The WebRatio Model Driven development environment allowing capturing business requirements in abstract model, i.e., Computationally Independent Model (CIM), in terms of Model Driven Architecture (MDA) paradigm as is defined by OMG (Object Management Group) and automatically generates a full-featured, industrial-strength, business application. The whole process is divided into three steps as follows:

- Design the Model – is a step of development process concerning with creation and verification of application model. This model is based on user requirements and constrains flowing from legacy situation, standards, company guidelines, etc.
- Customize the Rules – is a step of tailoring our model to better fulfil our requirements in more details. We can implement is this step, for example, a checking of input and output parameters, implement a constraining of different business criteria, add an online help, and so on.
- Generate the Application – in this step the WebRatio generates the whole application. It is the most complicated task, totally hidden from the view of end user. There is, of course, a possibility to affect the mode of generation by some parameters.

Now we can focus on the first step of development, i.e., on the step of designing the model. This step by the authors of WebRatio is illustrated in (Fig. 3, example is taken from [6]). We can observe that WebRatio includes two quite different diagrammatic instruments,

the first of them is a designer of standardized BPMN diagrams targeted modelling of business processes defined by the precedent analysis of business requirements, and second, the special designer of WebML web-method modelling notation, targeted modelling navigations between web site pages, content of these pages by means of many specialized WebML units, and eventually processes others than processes follow from business requirements. The first type of model, i.e., the process model, strongly based on BPMN notation, is used to define:

- Organisation and roles
- Activities and assignments
- Business roles
- Business workflow

The second model, i.e., the application model, is based on WebML modelling language, and is used to define:

- Page contents
- Business logic
- User interface & Visual identity
- Integration

In the frame of whole development process the construction of the first model precedes the second one. By the Author's opinion, this conception of utilisation of two very different types of model, managed by two different and independent subjects is very inventive. This concept also shows quite clearly a difference between a business and informational process, the subject, not very frequently discussed generally.

The four different perspectives of WebRatio tool development is illustrated in (Fig. 4, example is taken from [6]). We can observe that there are four different roles participating on development process, namely:

- Business analyst – creating a business model in BPMN based on users requirements
- Application/WebRatio Analyst – creating an application model in WebML based on users requirements, web site design guidelines and just created foregoing business model as well
- Web Designer – elaborating and completing the application model, as well as creating layout templates for all visual units of the system in order to produce a clear and well-arranged graphical appearance of all web pages of the web site
- Java Developer – developing and implementing custom components needed to implement all non-standard content, hybrid and process units of the model

The concept of Model-Driven Development Process implemented in WebRatio CASE tool is shown in (Fig. 5, example is taken from [6]). We start with a specification of traditional BPMN process model. In the second step we manually enrich and extend this model to create a choreography model (extended BPMN). Further, we run an automatic transformation of BPMN to WebML, then; we possibly repeatedly manually refine produced WebML models. And finally, we run automatic code generation on J2EE platform. The whole process is shown in the following.

1. Business process (BPMN) specification
2. Choreography model (extended BPMN)

3. Application Model (WebML)
4. Generating Application (J2EE)

In the following we try explaining next step of WebRatio combined WebML and BPMN development. The main question we need to explain herein is as follows, how we can generate the whole application specified in WebML from BPMN diagrams. To start we suppose following simple BPMN diagram (Fig. 6, example is taken from [10]) presenting a simple BPMN diagram of Product Catalogue Application. We see a business process borne by three business participant: Employee, Supervisor and Treasurer. The Employee performs Edit Report manual task, The Supervisor performs Review Report manual task and Treasurer performs Confirm Receipts manual task and Process Expanses service task.

The main principles of transformation process from BPMN to WebML are as follows:

- The manual tasks and gateways are not transformed at all
- The service tasks and gateways are transformed to operation module in WebML
- The user tasks and gateways are transformed to hybrid module in WebML
- There is generated one control site view for BPMN pool
- There is generated one site view for one BPMN line

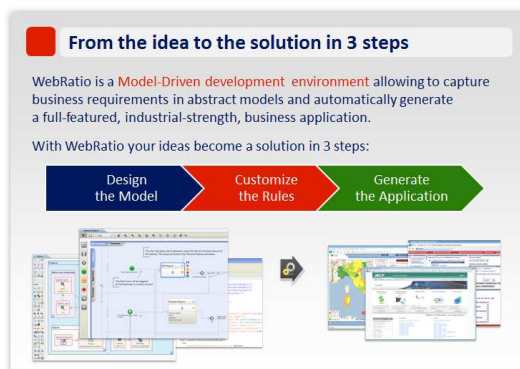


Fig. 2 - The whole development process with WebRatio tool

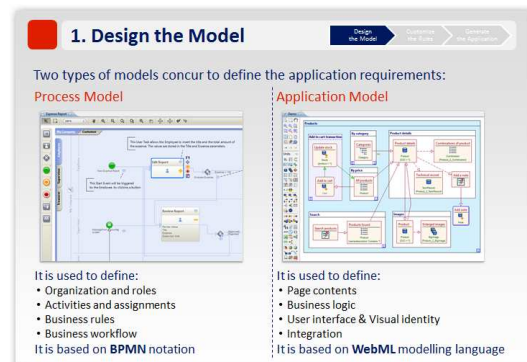


Fig. 3 - The types of models in WebRatio tool

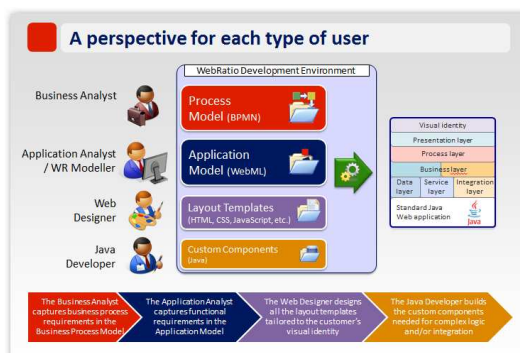


Fig. 4 - Different perspectives of WebRatio tool development

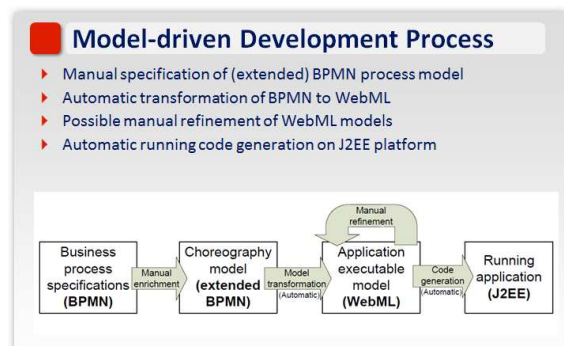


Fig. 5 - WebRatio Model-Driven Development Process

The result of such transformation of Confirm Receipts manual task is shown in (Fig. 7). We see that the Confirm Receipts task is transformed into Confirm Receipts web page in WebML model with three WebML units: Info, Get Parameters and User Input. We can also observe the process units needed for input and output parameters passing, located in the diagram outside the Confirm Receipts web page.

In conclusion, the whole transformation of BPMN model into WebML model implemented in WebRatio CASE tool is complex and sophisticated, but really implementing the Model Driven Development paradigm in its entirety.

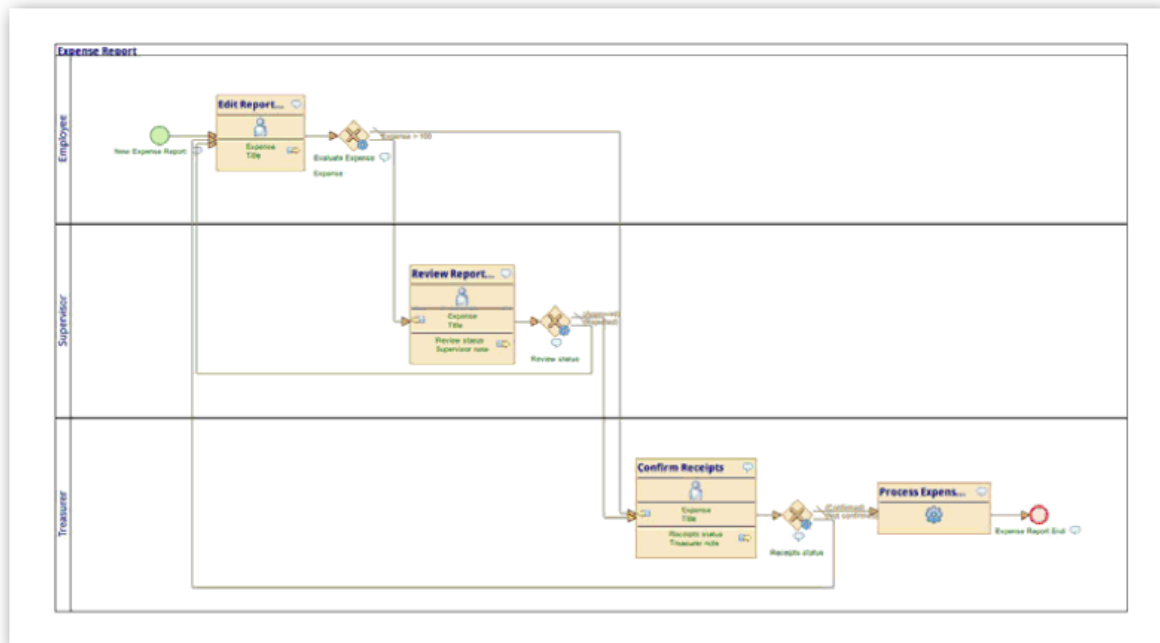


Fig. 6 - BPMN model of the Product Catalogue Application

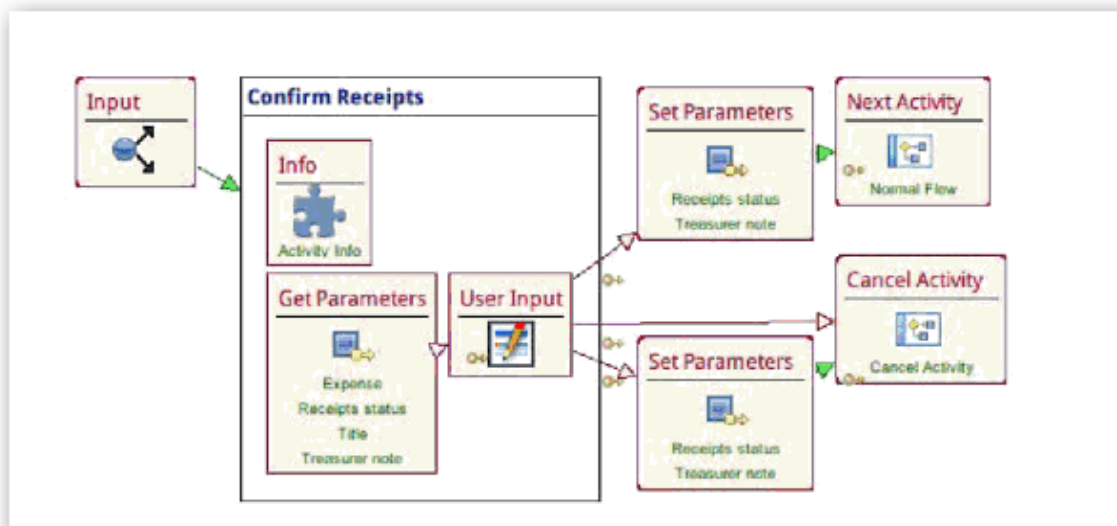


Fig. 7 - Generated WebML hypertext for the Confirm Receipt activity

4 CONCLUSION

In this article the Author present how is support of BPM implemented in WebRatio CASE tool. We want to note that WebRatio is one of the tools that fully implemented MDD (Model-Driven Development) approach, i.e., the capability to generate a whole application from the models without any single line of source code. This facility classifies WebRatio between excellent software engineering development tools today.

Acknowledgement This research (work) has been supported by Ministry of Education, Youth and Sports of Czech Republic under research program number MSM6840770017, SGS10/267/OHK3/3T/13 and SGS10/162/OHK3/2T/13.

In Prague, 17 April 2011
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