

# Evaluation of the BPMN According to the Requirements of the Enterprise Architecture Methodology

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**Abstract:** This article evaluates some characteristics of the Business Process Modelling Notation from the perspective of the business system modelling methodology. Firstly the enterprise architecture context of the business process management as well as the importance of standards are discussed. Then the Business System Modelling Methodology is introduced with special attention paid to the Business Process Meta-model as a basis for the evaluation of the BPMN features. Particular basic concepts from the Business Process Meta-model are mapped to the usable constructs of the BPMN and related issues are analysed. Finally the basic conclusions are made and the general context is discussed.

**Keywords:** enterprise architecture, business process modelling, business system modelling, Business Process Modelling Notation.

## 1. Introduction – enterprise architecture, business process management, and standards

Latest evolution of ideas in the field of Enterprise Architecture increasingly emphasizes the general and **managerial** aspects of enterprise to the detriment of the traditional aspects of **technology**. Nevertheless the phenomenon of technology has to remain critical and cannot be omitted because it gives the problem of the Enterprise Architecture the real historical basis.

Process oriented management is the leading idea of last two decades. It's importance is even emphasized in the context of the economic crisis nowadays when the ability to change become the vital condition for the prosperity. Process oriented management **lies on the border of the technology and management** fields. This fact exactly corresponds to the current characteristics of the Enterprise Architecture mentioned in the previous paragraph. Combining technology and management requires the standards to absorb the substance of both fields. These new requirements are challenging especially for the standards for modelling business processes which traditionally follow from the IS/ICT field.

This article describes the results and circumstances of the evaluation of the Business Process Modelling Notation (BPMN) in the light of the above mentioned facts following the previous author's work in this field Řepa (2011) in the context of the Enterprise Architecture.

The first complete explanation of the idea of process management as a style of managing an organization has already been published in Hammer, Champy (1993). The authors excellently explain the historical roots, as well as the necessity, of focusing on business processes in the management of the organization. The major reason for the process-orientation in management is the vital need for the dynamics in the organization's behaviour. It has to be able to reflect all substantial changes in the technology as well as in the market as soon as possible. The only way to link the behaviour of the organization to the changes in the market and technology possibilities is to manage the organization as a set of processes principally focused on customer needs. As customer needs, as well as requirements driven with the technology possibilities, are constantly changing the processes in the organization should change as well. That means that any process in the organization should be linked to the customer needs as directly as possible. Thus, the general classification of processes in the organization distinguishes mainly between:

- Key processes, i.e. those processes in the organization which are linked directly to the customer, covering the whole business cycle from expression of the customer need to its satisfaction with the product / service.
- Supporting processes, which are linked to the customer indirectly - by means of key processes which they are supporting with particular products / services.

Whilst the term "key process" typically covers whole business cycle with the customer - it is focused on the particular business case; the supporting process is typically specialized just to the particular service / product, which means that its product is more universal - usable in a number of business cases. This approach allows the organization to focus on the customers and their needs (by means of the key processes), and to use all the traditional advantages of the specialization of activities (by means of the supporting processes) at the same time. Key processes play the crucial role - by means of these processes the whole system of mutually interconnected processes is tied together with the customers' needs. Supporting processes are organized around the key ones, so that the internal behaviour, specialization, and even the effectiveness of the organizations' activities are subordinated to the customers and their needs.

Concluding from previous paragraph we can summarise the key principles of the process-oriented management of the organization:

Change as a principle - the concept of change changes its nature. If the organization should fulfil the need for dynamics stated above the change has to become an integral part of it's life instead of something exceptional.

Critical need for modelling business processes is the direct consequence of the previous principle. Processes have to be modelled in order to allow:

- permanent following the nature of the business to ensure the correctness of changes according to general business rules;
- permanent seeking for possibilities of changes in the business with use of new possibilities.

Changing business means changing processes exploiting new possibilities which are not just in the field of technology but also in people minds, social system etc. All these possibilities for the change should be taken into the account while modelling business processes. In order to fully and meaningfully exploit the possibilities of change it is necessary to have the notion of the substance of business - what is necessary and what is not, what is changeable and what is not. It means that the business process modelling methodology should be able to find this substance of business by means of it's methods and techniques.

These principles express the essence of the requirements for the business process modelling methodology as well as for the incidental techniques, languages, and standards.

Standards play very important role in the process of the technological, economic, as well as social development. Existence and quality of standards are the critical factors for the progress in any field. In the field of Enterprise Architecture this means especially modelling languages standards allow production of supporting systems - CASE tools. Producers of such systems need to believe that the number of possible customers will allow covering of their development costs; standards are allowing such cumulation of customers. If there are not standards the investment power of particular producers is too low to allow creation of the significant market with tools which forces the competitors to increase the quality of their products permanently. Without such permanent growth of quality the feedback to the theory (background of standards) is either missing or is not strong enough to allow the adequate growth of the theory. So the theory and the tools are mutually dependent. Theory needs tools to be evaluated and corrected in praxis which is the main condition of it's qualitative growth. Tools need theory to produce good and usable standards which allow sufficient market possibilities as a vital condition for their development. Theory needs good tools and vice versa: tools need good theory. In the intersection of this mutually dependent factors lie standards.

Business Process Modelling Notation<sup>1</sup> (BPMN) as a language for modelling business processes (Business Process Model and Notation (2011)). is a most important standard fulfilling the above stated requirements for the standardisation. Among other popular standards (Mayer, Menzel, Painter, deWitte, Blinn, Perakath (1997), Workflow Management Coalition Standards Framework (2012)) only the BPMN became widely accepted by users as well as by CASE tools producers, and is developed concerning other related significant technology standards (Reference Model for Service Oriented Architecture (2006), Service Science Management and Engineering (2012), UML OMG Unified Modeling Language Specification (2003)) which is the basic condition for fulfilling the full meaning of standardisation. This fact qualify the BPMN for being a leading professional standard in the field of

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<sup>1</sup> *Although the current name of the standard is "Business Process Model and Notation" in this article we use rather the original name from the version 1.0 (Business Process Modeling Notation Specification (2006)), because it better expresses it's nature in our opinion.*

business process modelling. The other side of such a position is the responsibility for the progress in the field. Therefore this article evaluates some characteristics of the BPMN from the perspective of the business system modelling methodology. For the wider context of this approach as well as for more general argumentation see Simeonov, Ehresmann, Smith, Ramirez, Repa (2011).

## 2. Business Processes Modelling Methodology

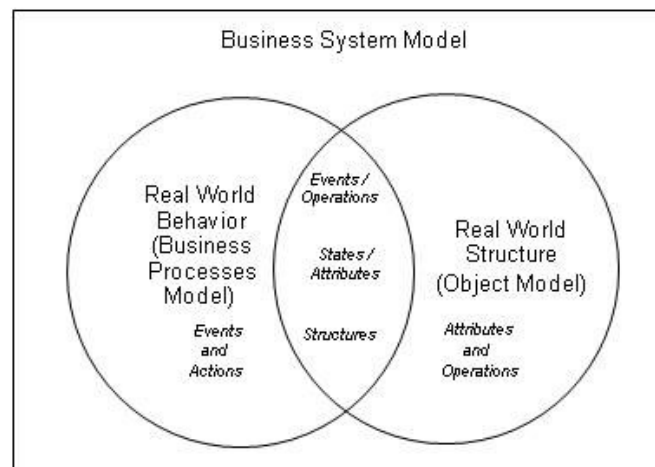
The main basis for the methodical requirements for the business process modelling presented in this article is the Business System Modelling Methodology. This methodology is a product of the OpenSoul project (Opensoul, 2012) which is a central part of the Enterprise Architecture global methodology developed at the Prague University of Economics, Department of Information Technologies. Business process modelling is a part of topics covered with this methodology.

Although this article is aimed on the topic of the business process modelling namely on the BPMN language the context of the Business System - Enterprise Architecture is very important and cannot be omitted. Therefore we pay some attention to the modelling of business systems before we focus on the business process modelling only.

### 2.1 Modelling the Business System

The methodology for the modelling of the business system is based on the idea of the two basic dimensions of the business system model (see Figure 1). Two main dimensions of the Business System model are:

1. the structure of the Real World (the view on the Real World as a set of objects and their relationships),
2. the behaviour of the Real World (the view on the Real World as a set of mutually connected business processes).



**Figure 1: Two Dimensions of the Business System Model**

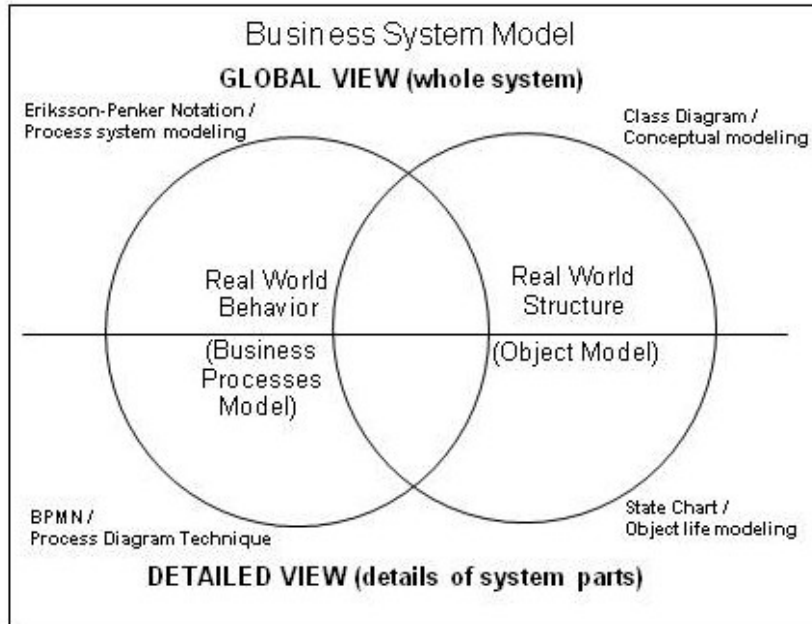
Both dimensions have common intersection. The intersection contains, besides the static object aspects as attributes and data structures, also typical dynamic aspects as events, methods, and object states. Thus the description of dynamics is not just the matter of the behavioural model. It is the matter of the conceptual model as well.

Business process is a process of achievement the human will. It has the goal, and the product(s). It typically combines different business objects giving them the specific meaning (roles of actors, products, etc.). Business objects may be specified in detail by the description of their life cycles. Object life cycle is a description of business rules connected with the object in terms of states and transitions. Each transition has associated event (transition reason), and operation (transition method).

Objects are typically taking different roles in different processes giving them the context (Real World rules) while business process, following the process goal, typically connects lives of several objects. For detailed discussion of the main differences between object life cycles and business processes see Business System Metamodel (2012), Repa (2007) and Řepa (2008)

Besides the two-dimensional approach to the business system modelling there are also two basic complementary views on the system (see Figure 2):

1. global view on the whole system abstracting from details,
2. detailed view on just a part of the system abstracting from the whole.



**Figure 2: Two Views on two dimensions of a Business System**

Each global model describes the structure (objects in general) of the system while each detailed model is oriented on the dynamics (processes in general). Nevertheless it does not brake previous principle of two basic dimensions of the Real World Model. If we combine these two basic dimensions with two basic views we get four basic kinds of models of the business system:

- global model of objects - conceptual model (Class Diagram)
- detailed model of one object - object life cycle (State Chart)
- global model of processes - model of the system of processes (Eriksson-Penker Diagram)
- detailed model of one process - model of the process run (BPMN diagram)

**Table 1: Two basic views on two basic subjects of interest in a Business System**

view / subject	Business Objects	Business Processes
Global view	<b>conceptual model (Class Diagram)</b>	<b>process system model (Eriksson-Penker Diagram)</b>
Detailed view	<b>object life cycle (State Chart)</b>	<b>model of the process run (BPMN diagram)</b>

So one can speak about the process view on an object (detailed description of object's life cycle) as well as about the object view on business processes (global process model). In other words the world of objects has also its dynamics (behaviour) as well as the world of processes has also its structure (objects).

Table 1 shows how the BPMN language as a process-oriented description of the business process covers only one part of the behavioural dimension of the Business System Model. BPMN does not cover the problem of global modelling of the process system. Mostly accepted modelling standard suitable for this purpose is the Eriksson-Penker Notation (Eriksson, Penker, 2000). Eriksson-Penker Notation was created as an extension of the UML (UML Superstructure Specification, 2005) what well

corresponds with the fact that the global view on processes is object-oriented - it is the conceptual model of business processes in fact.

In accordance with the topic of this article the following text is focused just on the detailed business process model, and BPMN language.

## 2.2 Modelling business processes as a part of a business system

Process Diagram Technique aims to offer the set of concepts, symbols and rules, using which the modeler is able to describe all substantial characteristics of the real world behaviour in as simple way as possible.

The OpenSoul project (Opensoul, 2012) provides the process meta-model” which describes the key concepts of the technique together with their relationships. In the centre of interest there are two main concepts:

- Stimulus, and
- activity

Stimuli are of two main types:

- external (Event) and
- internal (State)

Activities are of two main types too:

- Processing Activity. The purpose of this activity is processing inputs to outputs) and
- Control Activity (Decision or Logical Connector). The purpose of this activity is to ensure right control of the process – succession of the right activities according to the internal process state(s) and/or external stimuli and information.

For simplification of the model there is also special kind of control activity defined – Logical Connector. It is the very simple (primitive) decision where does not need any information at the input (conjunction and disjunction).

Description of the process expresses the way how the inputs are transformed to the outputs by the activities in their defined succession. Input/Output Sets are defined in three types:

- Information Set
- Material Set, and
- Mixed Set

The main purpose of such an approach is to distinguish between the object of the processing (“material and the information for the processing control (“information“).

In addition the technique allows modelling of the external aspects of the process

- Actors (attendees or “victims“ of the process activities)
- Organization units and
- Problems connected to the process
- any other external aspect whose relation to the process is important

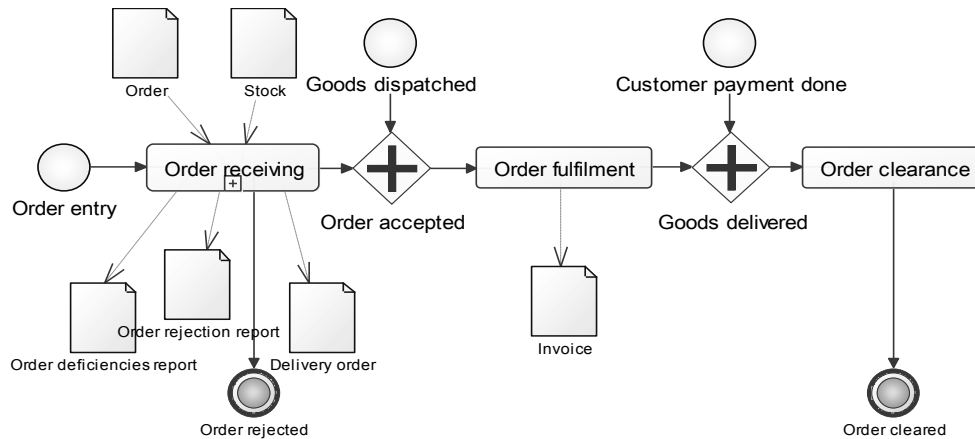
For exact description of the basic concepts and their relationships of the Technique, see the meta-model (Opensoul, 2012) also described in the following section.

Events, states, and activities of the process play a crucial role in the process model.

The model describes two different but mutually interconnected matters:

- basic logic of the process (flow of activities);
- possible external impacts on the process (events).

States of the process are the consequence of the integration of these two matters. They represent waiting for the event (or combination of events) in particular place of the process. This way every process state expresses the need for synchronization of the external happening, manifesting itself by events, with the essential process logic. As the external happening is principally asynchronous with the process logic it is necessary to synchronize them - process must wait for every event (see figure 3 for example).



**Figure 3 Business Process Model (BPMN notation)**

Figure 3 illustrates the use of above stated technique. It shows how the process description emphasizes the most important aspects of the process:

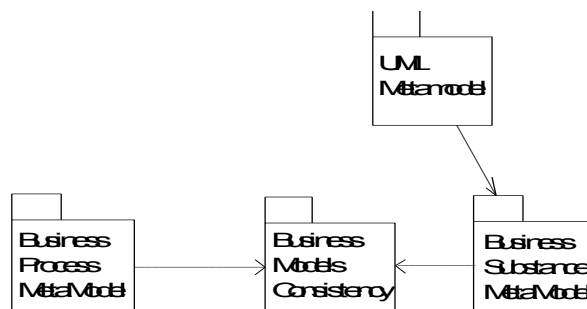
- events and their consequences – process activities and states (i.e. points of waiting for the event),
- inputs and outputs processed by the process including the main process product (i.e. the main reason for the process run).

### 2.3 Business Modelling Specification and Business Process Meta-model

Business Modelling Specification consists of three associated packages (see Figure 4):

- Business Substance Meta-Model package
- Business Process Meta-Model package
- Business Models Consistency package

Business substance and business processes represent two basic dimensions of the real world model mentioned in previous text. Each of both packages specifies basic concepts required for a model of given dimension together with basic rules expressing the business logic given by the dimension. As each of both models provides general basis of all possible models in given dimension, they both are Meta-Models.

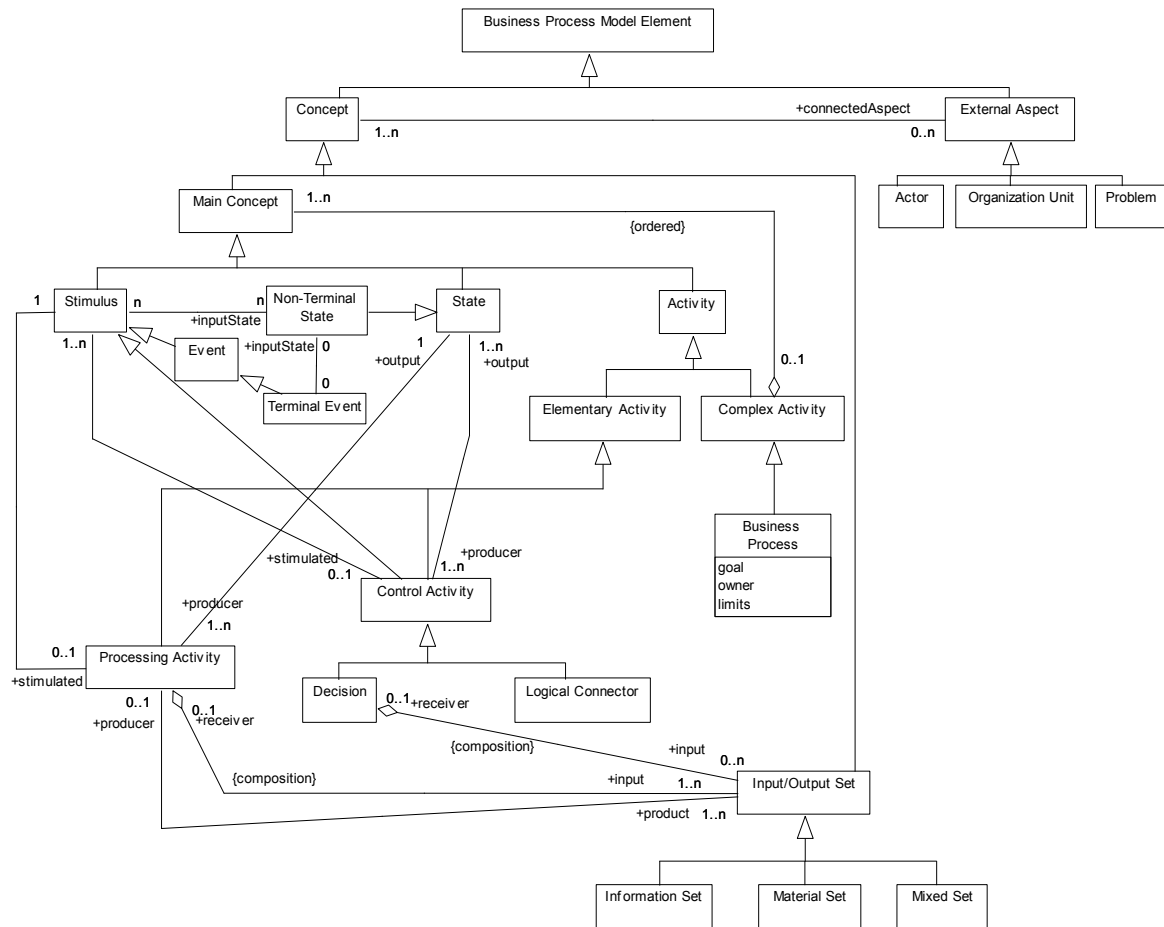


**Figure 4 Business Modelling Specification Overview**

Unlike two other packages Business Models Consistency package is not a Meta-Model. It provides general basis for modelling mutual interconnections and dependencies of both Meta-Models. In that sense, it extends both Meta-Models with new concepts in order to address general mutual dependencies of the real world models.

The Business substance model is based on the UML Class Model with minimal extensions. Business process model has its own rules that are not present in current version of the UML. Naturally, the inter-models consistency rules are not present in current version of the UML as well.

**Business Process Meta-Model** package (see Figure 5) specifies the basic concepts required for a model of a business process and defines basic needs/possibilities of their mutual interconnections (i.e. business process modelling logic - "how to model behaviour of the real world").



**Figure 5 Business Process Meta-Model Package**





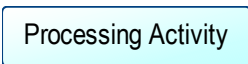
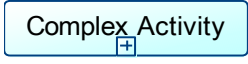

- Control Activity as a Stimulus inherits the stimulation competence. Together with that fact, from the multiplicity 1 (i.e. monopoly) of the stimulation association follows that Processing Activity can be stimulated either by Event or by Control Activity exclusively.
- Each Stimulus has to have at least one input state except the first one (Terminal Event). Terminal Event has no input state. This exception is expressed by the specific zero-multiplicity association with Terminal Event which overwrites the inherited general association between Stimulus and Non-Terminal State.
- Each State has to be the input for at least one Stimulus except the last one (Terminal State), which has no succeeding activity.
- Characteristics of terminal event as well as of terminal state are relative to the specified model. Usage of the model as a part (sub-process) of another model will change all terminal events of sub-process to regular ones and all terminal states to internal ones from the super-process point of view.
- Processing Activity and Decision are both composite aggregates of Input/Output Sets. As it follows from that fact, one particular Input/Output Set can input either to Decision or to Processing Activity exclusively.

For more detail as well as for the wider context see the OpenSoul Portal (Opensoul, 2012).




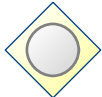

### 3. Evaluation of the BPMN possibility to meet the methodology requirements

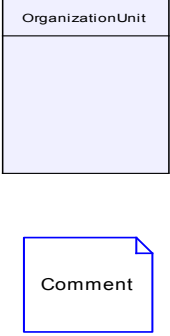
In this section we deal with the question how to use the BPMN in accordance with the methodology. In the following table particular basic concepts from the Business Process Meta-model are mapped to the usable constructs of the BPMN.

**Table 2: Mapping of basic elements of a process model on constructs of the BPMN**

	Usable BPMN Construct	Description
Event	   <<Start Timer>>	<p>External stimulus for the activity. Information about the event outside of the process and independent on it.</p> <p><i>From the BPMN constructs it is possible to use</i></p> <ul style="list-style-type: none"> <li>• the “Start“ symbol with the name of the event. for ad-hoc events</li> <li>• the "Timer" symbol with the name of the event. for timed events</li> </ul> <p><i>Despite it's name the Start symbol should be used several times – for each ad-hoc event. As the very start event of the process is always recognizable from the process logic there is no need to use specific symbol to identify it.</i></p> <p><i>BPMN offers a lot of other specific types of the event. From the Methodology point of view there is no need to classify events in more detail. Moreover, some of specific types of the event offered by BPMN may be implemented in various CASE tools contradictory to their origin defined in the meta-model.</i></p>
Internal State	 <<Parallel(AND)>> Internal Process State	<p>Internal state of the process. Result of the preceding activity. Waiting for the external stimulus. Synchronisation of the process with the external event.</p> <p><i>From the BPMN constructs we recommend to use the “Parallel (AND)”gate symbol which in the mode 1:n (merge) naturally means synchronization.</i></p>
Terminal State		<p>End state of the process.</p> <p><i>BPMN offers specific constructs - the “End“ symbol.</i></p>
Activity	  	<p>Basic element of the process - input(s) to output(s) processing. Activity is decomposable on principle, i.e. it can be always regarded as the process (on the deeper level of detail).</p> <p><i>BPMN distinguishes between elementary and complex (compound) types of activity. Compound activity can be regarded as a standalone process and it is labelled with the + sign.</i></p>
Decision		<p>Decision on the particular follow-up of the process. Decision is always an elementary (i.e. non decomposable) activity.</p>



	Usable BPMN Construct	Description
	 <<Complex>>	<p>BPMN also offers the "complex decision" which in fact represents general decision. Nevertheless it is explained as a specific type of "gate" which consequently means any combination of primitive (i.e. predefined) decisions. This construction does not make a sense in general because such arbitrary combination of predefined meanings (and/or/xor) never can be unambiguous. Therefore this construct is unusable for exact specifications.</p>
Logical Connector	 <<Parallel(AND)>>   <<Data-XOR>>   <<Inclusive(OR)>>	<p>Primitive decision without any information at the input (pre-defined decision).</p> <p>From the BPMN constructs it is possible to use the standard gates AND, XOR, OR (inclusive). BPMN recognizes two basic sub-types of XOR (Data XOR and Event XOR). BPMN does not explain what is the natural meaning of decision. Therefore in some implementations some specific sub-types may contradict with the Meta-model which stated that decision is a kind of activity. It is because sometimes they use to be implemented (and thus interpreted) as some different concept than activity. This is one of typical effects of the lack of semantic meta-model of the BPMN exactly defining the relation between the language and the methodology for business process modelling.</p>
Input / Output	 Input/Output	<p>Input into /output of the process.</p>

	Usable BPMN Construct	Description
External Aspect		<p>Any external aspect connected to the process in the particular point.</p> <p><i>BPMN uses the „swim lanes“ style for expressing organizational units. Unfortunately it reduces possibilities of organization structure independent description of the process (what is the basic principle of process management, by the way).</i></p> <p><i>Fortunately, many CASE systems allow to switch to the traditional description (using the “Actor” symbol for instance).</i></p> <p><i>From the BPMN constructs it is also possible to use the „Note“ symbol.</i></p> <p><i>Another general possibility is to describe the aspect as an attribute of the process or its particular part.</i></p>

#### 4. Conclusions

At the end of the previous section some aspects and problems connected with the BPMN are discussed. From the fact that BPMN currently works as an accepted standard in the field of business process modelling follows that it has to take the responsibility for its contents. In other words the standard has to be good enough for supporting all the needs of the real world in the area which the standard aims to cover. These needs are always expressed by the methodology. The methodology for modelling business processes as a part of the Enterprise Architecture Methodology discussed in this article thus works for us as a basis and a source of requirements for the necessary attributes of the BPMN which the language has to meet in order to fulfil mentioned general responsibility of a standard.

The following summary of most important facts shows some requirements for the future BPMN development.

##### Meta-model of the language:

From the version 2.0 (Business Process Model and Notation (2011)). BPMN is based on the formal meta-model in style of the UML (UML Superstructure Specification, 2005). The meta-model follows the global principle of the OMG language specifications: principal independence of any methodology. The consequence of this attempt to separate the language from the expressed content is the fact that the meta-model is reduced mainly to the classifications of concepts with minimal information on their relationships, and consequently with minimal space for expressing the semantic constraints of the language. Philosophy of Language (see Miller, 2007 for instance) undoubtedly shows that semantic aspects of the language always follow from the style of thinking; different languages represent different styles of thinking as it is visible on the principal difference between the European and Asian languages in comparison with the difference between related philosophy systems for example. The same rule is valid also in the field of formal languages. As the language aims to be technically "methodology independent" it is losing the main characteristics of the language: the competence to express the content.

So we propose to develop the semantic oriented meta-model of the BPMN which exactly defines the relation between the language and the methodology for business process modelling. The core package of such meta-model should express the main methodology principles of modelling business processes like it is in Business System Metamodel (2012) for example.

##### Global business processes model:

The Business System Modelling Methodology (Opensoul (2012), Business System Metamodel (2012]) defines two basic complementary views on the business system - the global versus detailed one (see Figure 2). Current version of the BPMN represents just the detailed view (description of one particular

business process). However the global perspective of business processes (view of all business processes as a system) is not substitutable with the detailed one (details of one single process run) in principle. Therefore we recommend to complete the BPMN also with the global view. The Eriksson-Penker Notation (Eriksson, Penker, 2000) which is based on the UML (UML Superstructure Specification, 2005) and widely accepted is the best candidate for such complement.

#### **Actually needed changes in the BPMN:**

Based on the evaluation of the BPMN from the methodology point of view (see the previous section) we summarize following required changes of the BPMN:

- including the concept of State. State is completely missing as a concept in the BPMN meta-model. As a temporary solution of this problem the "Parallel AND" gate can be used (see the argumentation in the previous section). Nevertheless it causes consequential problems. The internal process state is not the synchronization only. It is just its technical meaning. Semantically it represents the important cross-point in the process where the internal process logic meets possible external influence. Thus the importance of this concept overcomes the process itself as it represents the basic point of inter-process communication. Of course, it is necessary to watch the language not only from the technical viewpoint for taking this fact into the account. So the state should be a regular, and very important, concept of the BPMN meta-model.
- restructuring Events: BPMN contains a number of kinds of events of various origins. Some of them use to be interpreted as production activities, some of them as decisions, data, flows or other "physical" substances. Consequently the exact semantic meaning of this concept remains undefined. The Methodology defines the event as external influence on the process. It means:
  - event has no duration (its main attribute is the time of occurrence),
  - event always represents some typical content: according to its basic type. There are two basic types of event:
    - Ad hoc event always requires the additional information (i.e. it is always related to some data in technical sense);
    - predefined event (Timer) does not require an additional information. Its only variable attribute is the time of occurrence because the content (meaning of the event) is predefined.

For detailed information about the Methodology contents see the Business System Specification (Business System Metamodel. 2012)

The above mentioned requirements to the BPMN are mutually closely interconnected. The root of all problems can be found in the first paragraph where the need for semantic oriented meta-model is discussed. It is *the lack of the exactly defined relation between the language and the methodology for business process modelling*. This problem seems to be typical as it occurs also in other UML related standards for modelling. By the task of modelling the systems are overcoming the border between technology and other real world phenomena which are bringing completely new requirements for the content of languages. The conception of language is changing and languages have to adopt the ontology of related areas as it is clearly expressed in the S-GAIA model (Simeonov, Ehresmann, Smith, Ramirez, Repa, 2011) for instance.

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## **5. References**

*Business Process Model and Notation* (BPMN), 2011. OMG Document Number: formal/2011-01-03, Standard document URL: <http://www.omg.org/spec/BPMN/2.0>

*Business Process Modeling Notation Specification*, 2006. OMG Final Adopted Specification, February 2006, dtc/06-02-01 ([http://www.bpmn.org/Documents/OMG\\_Final\\_Adopted\\_BPMN\\_1-0\\_Spec\\_06-02-01.pdf](http://www.bpmn.org/Documents/OMG_Final_Adopted_BPMN_1-0_Spec_06-02-01.pdf))

Eriksson, H.E., Penker, M., 2000. *Business Modeling with UML: Business Patterns at Work*, Wiley

Hammer, M., Champy, J., 1993. *Reengineering the Corporation: A Manifesto for Business Revolution*. London: Nicholas Brealey Publishing

- Mayer, R.J., Menzel, C.P., Painter, M.K., deWitte, P.S., Blinn, T., Perakath, B., 1997. *IDEF3 Process Description Capture Method Report*, Knowledge Based Systems, Inc.,
- Miller, A., 2007. *Philosophy of Language*, Routledge - Taylor & Francis
- Repa, V., 2012. *OpenSoul Project*: <http://opensoul.panrepa.org>
- Repa, V., 2012. *Business System Modeling Specification*.  
<http://opensoul.panrepa.org/metamodel.html>
- Repa, V. 2007. Modeling Objects Dynamics in Conceptual Models. Budapest 31.08.2007 – 02.09.2007. In: *Advances in Information Systems Development*. New York : Springer, pp. 139–152.
- Řepa, V., 2008. Process Dimension of Concepts. In: JAAKKOLA, H., KIYOKI, Y., TOKUDA, T. *Information Modelling and Knowledge Bases XIX*. Amsterdam : IOS Press, pp. 322–329.
- Reference Model for Service Oriented Architecture 1.0*, OASIS Standard, 12 October 2006 (on: <http://docs.oasis-open.org/soa-rm/v1.0/>)
- Service Science Management and Engineering, 2012.  
<http://www.ibm.com/developerworks/spaces/ssme>
- Simeonov, P.L., Ehresmann, A.C., Smith, L.S., Ramirez, J.G., Repa, V., 2011. A New Biology: A Modern Perspective on the Challenge of Closing the Gap between the Islands of Knowledge, in *ServiceWave'10 Proceedings of the 2010 international conference on Towards a service-based internet*, Springer-Verlag Berlin, Heidelberg,
- UML OMG Unified Modeling Language Specification*, 2003, v. 1.5. document ad/03-03-01, Object Management Group
- UML Superstructure Specification*, 2005, v2.0 document 05-07-04, Object Management Group, 20'04
- Workflow Management Coalition Standards Framework*, 2012: <http://www.wfmc.org/wfmc-standards-framework.html>
- Řepa, V. 2011. Business Process Modelling Notation from the Methodical Perspective, in *ServiceWave'10 Proceedings of the 2010 international conference on Towards a service-based internet*, Springer-Verlag Berlin, Heidelberg

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