

Towards the Business Process Model as Code Approach

Dmytro Orlovskyi and Andrii Kopp

National Technical University “KhPI”, Kyrpychova str. 2, 61002 Kharkiv, Ukraine
{orlovskyi.dm, kopp93}@gmail.com

Abstract. Business process management and its modeling capabilities are vital for successful analysis, improvement and automation of core organizational processes. However, manual process model design is error-prone, while graphic models are almost not traceable and reusable. Thus, Everything as Code practice, successfully used in software engineering, can be also applied to business process modeling domain. This study shows the idea of process model as code approach and early results in this field.

Keywords: business process model, business process model as code practice, model quality, traceability, reusability.

1 Introduction

Business Process Management (BPM) is a discipline that serves to align business and IT by providing business process modeling capabilities used to:

- design and analyze information systems that support organizational workflows execution;
- communicate with stakeholders involved in business process execution and management.

Business process modeling capabilities of BPM are vital for successful business process execution, as well as changes including business process identification, analysis, redesign, automation, and monitoring.

Therefore, process models should not have design flaws that could negatively affect their usage. Recent studies in the field of business process model quality assurance, such as [1] and [2] consider usage of different measures and thresholds in order to detect issues in process models structure.

However, real enterprise business process models could be large and complex for manual design and control of their correctness. Also maintenance of large collections of process models requires model patterns reusing and version control, similarly to the way how the source code treated in software engineering [3].

Thus, it seems relevant to apply the Everything-as-Code practice to business process modeling [4]. Business process models as code are expected to better suit for version control and fragments reuse rather than graphic or binary documents, created in business modeling software tools, and even better than XML-based (eXtensible Markup

Language) documents that contain structural definitions and visual design elements of BPMN (Business Process Model and Notation) and ARIS (Architecture of Integrated Information Systems) models [4]. The fragment of BPMN 2.0 code is shown in Fig. 1.

```

4 <bpmn:startEvent id="StartEvent_10ec17t">
5   <bpmn:outgoing>Flow_04wmg8i</bpmn:outgoing>
6 </bpmn:startEvent>
7 <bpmn:task id="Activity_1aulgj8" name="Confirm an order">
8   <bpmn:incoming>Flow_04wmg8i</bpmn:incoming>
9   <bpmn:outgoing>Flow_0d8zken</bpmn:outgoing>
10 </bpmn:task>
11 <bpmn:sequenceFlow id="Flow_04wmg8i"
12   sourceRef="StartEvent_10ec17t"
13   targetRef="Activity_1aulgj8" />
14 <bpmn:exclusiveGateway id="Gateway_0rsnvz6">
15   <bpmn:incoming>Flow_0d8zken</bpmn:incoming>
16   <bpmn:outgoing>Flow_0gtaof0</bpmn:outgoing>
17   <bpmn:outgoing>Flow_1x2vdv2</bpmn:outgoing>
18   <bpmn:outgoing>Flow_1wfsj9t</bpmn:outgoing>
19 </bpmn:exclusiveGateway>

```

Fig. 1. Fragment of XML-based BPMN exchange file

On the other hand, immediate code syntax and semantics checks in used IDE (Integrated Development Environment) could prevent design mistakes [4], such as:

- connectors mismatch, when any split gateways do not have corresponding join gateways and vice versa (see Fig. 2);

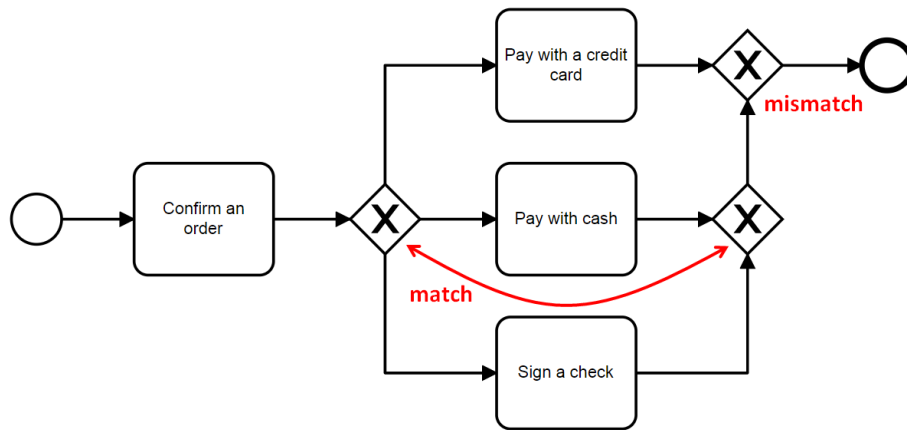


Fig. 2. Connectors mismatch example in BPMN process model

- missing connectors, when parallel splits or exclusive choices are implemented without AND- or XOR-split gateways, as well as when synchronization or merge patterns are implemented without AND- or XOR-join gateways (see Fig. 3).

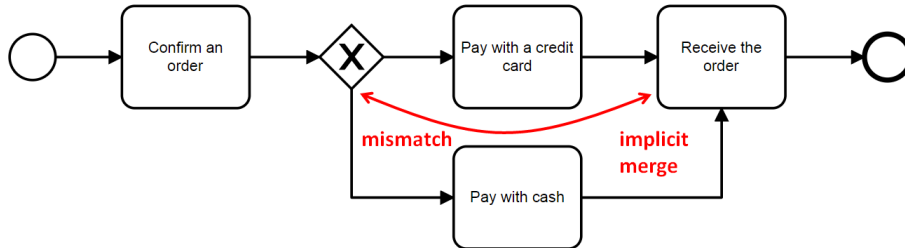


Fig. 3. Missing connectors example in BPMN process model

Considering benefits of version control, fragments reuse, and design mistakes prevention, which Everything-as-Code practice can bring to the business process modeling field, this study aims to improve traceability, reusability, and quality of designed process models.

2 Methods

Proposed approach has been inspired by CI (Continuous Integration) and CD (Continuous Delivery) practices widely used in software engineering projects [5]. According to these practices, business process models designed as code should be committed to a Version Control System (VCS) like Git or similar distributed repository. The VCS serves as the source for executable software builds, whereas in this particular case the source code is used to build executable business process models (e.g., BPMN 2.0 files). The same as software tested, quality of business process models is analyzed using existing methods based on structural metrics and threshold values, or using advanced techniques based on business process model quality criteria. Process models that successfully passed the quality check stage then deployed to a BPM system.

3 Results and Discussion

The baseline architectural model of the proposed approach is demonstrated in Fig. 4.

However, the general problem includes development of a meta-model for the process model as code description. It is planned to be done using some object-oriented programming language, on top of which a framework for process model as code description should be developed.

4 Conclusion

In this paper we have proposed the approach to business process model as code description, inspired by Everything as Code practice, in order to improve traceability, reusability, and quality of designed process models. The weakness of the current manual-based process modeling practice is outlined, as well as the expected benefits of the proposed approach are demonstrated. The baseline architectural model is presented and

future research in this field, related to process model as code framework design and development, is formulated.

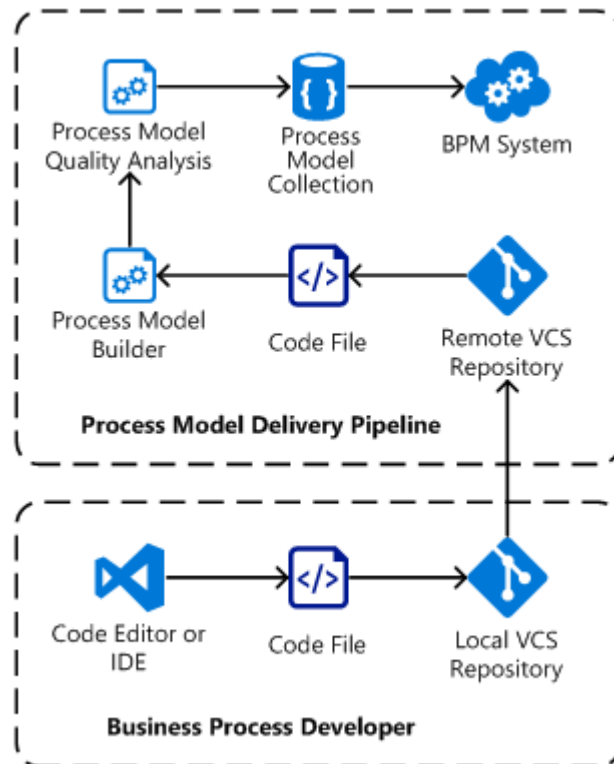


Fig. 4. Baseline architectural model of the proposed approach

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