

## The Value Management Platform and ArchiMate – Towards an Integration? An Illustrative Example for Value Stream Mapping

Geert Poels<sup>1</sup>, Kathleen Nollet<sup>1</sup>, Ben Roelens<sup>1,2</sup>, Henk de Man<sup>3</sup>, Theodoor van Donge<sup>3</sup>

<sup>1</sup> Faculty of Economics and Business Administration, Ghent University, Belgium  
{geert.poels, kathleen.nollet}@ugent.be

<sup>2</sup> Faculty of Management, Science and Technology, Open University, The Netherlands  
ben.roelens@ou.nl

<sup>3</sup> VDMbee, Schietboom 2, 3905TD Veenendaal, The Netherlands  
{hdman, tvdonge}@vdmbee.com

**Abstract.** The Value Management Platform (VMP) of VDMbee is one of few strategy and business model development tools that were inspired by the Object Management Group's VDML standard for value modeling. ArchiMate is The Open Group's specification of an enterprise architecture language that goes well together with their TOGAF framework, which is widely used by enterprise architects. Although VMP and ArchiMate were developed for different reasons, the evolution of both enterprise engineering instruments seems to converge towards a large(r) common ground. For instance, the most recent addition to ArchiMate is the Value Stream element, allowing ArchiMate to be used for value stream mapping (in line with TOGAF), for which support is also provided by the VMP. As another example, VMP now integrates the Process Designer tool which allows generation of BPMN 2.0 business process diagrams from value stream maps. Despite this observed convergence, each approach has its own purpose like providing a framework for strategy planning and execution for VMP and providing structure and context amongst the many artifacts that comprise an organization's architecture for ArchiMate. In this paper, we question whether the integration of both instruments would be useful for practice and present a scientifically viable research topic. As a preliminary, but necessary, step for any kind of integration, we propose to investigate how VDML (and other) artifacts underlying enterprise modeling with VMP map onto ArchiMate. As an illustrative example, we demonstrate how value streams designed with VMP can be visualized with ArchiMate.

**Keywords:** Business model representation, Business ecosystem modeling, Value modeling, Value stream mapping, Value management, Enterprise architecture modeling, Value Delivery Modeling Language, Value Management Platform, ArchiMate, TOGAF

## 1 Motivation

Since the adoption of the Value Delivery Modeling Language (VDML) [13] by the Object Management Group (OMG) in 2015, VDMbee<sup>1</sup> made efforts to enable its application in practice. This has resulted in the development of the Value Management Platform (VMP), which is a software tool for the application of value-driven strategic planning according to the Continuous Business Model Planning (CBMP) method [14]. Through the discover, prototype and adopt stages of the CBMP process, ‘business user-friendly’ VMP techniques (e.g., canvasses, maps and storytelling) are used to develop a phased strategic plan that is translated into alternative scenarios of structured business model ecosystems for the involved participants. Aggregating business model values to strategic plan values allows deciding on the strategy execution roadmap to be adopted. Comparing planned values with actual performance results allows monitoring strategy execution. Throughout this process, the complexity of creating, querying and managing VDML models is hidden for VMP users.

Recently added VMP functionality includes a Process Designer for BPMN 2.0 diagrams, which is an implementation of the Camunda<sup>2</sup> supported bpmn.io BPMN Viewer and Editor.<sup>3</sup> Similar plans exist for integrating a Case Designer for CMMN 1.1 diagrams. With these extensions, VMP crosses the border between the structural layer and the operational layer of the business architecture [17] and moves towards providing an integrative architectural view of an organization.

Enterprise Architecture is the discipline par excellence that focuses on providing this integrative view. Since 2008, The Open Group has been developing ArchiMate [23], which complements their TOGAF framework [22] by offering a language to create enterprise architecture models which can be visualized as TOGAF views. ArchiMate has evolved from an initial focus on business/IT alignment in an organization’s core architectural layers (i.e., business, applications and technology) to more attention for enterprise coherence governance, including a focus on strategic fit. The ArchiMate metamodel includes concepts such as capability, resource, course of action (to represent strategies and tactics) and value to cover Business Architecture domains [4].

ArchiMate’s increased support for strategy implementation [2] has also been the object of study in academic research that investigated how to represent business models, capability models, and value models with ArchiMate (e.g., Fritscher & Pigneur [7], Meertens et al. [12], Singh [20], de Kinderen et al. [5], Iacob et al. [9], Azevedo et al. [3], Aldea et al. [1], and Sales et al. [18], [19]). Initial mappings of VDML to ArchiMate were presented by Ding [6] and Lankhorst et al. [10], while Harot [8] investigated whether a mapping from VDML to ArchiMate is best incorporated as a new layer, a new aspect or an extension of ArchiMate’s strategy layer – The recent addition of Value Stream as a strategy layer element to ArchiMate’s metamodel (see Section 3) seems to confirm the latter choice. The observed convergence in coverage of business architec-

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<sup>1</sup> [www.vdmbee.com](http://www.vdmbee.com)

<sup>2</sup> [www.camunda.com](http://www.camunda.com)

<sup>3</sup> [www.bpmn.io](http://www.bpmn.io)

ture modeling points at opportunities for research on how to move from strategy planning with VMP (following CBMP) to strategy implementation supported by ArchiMate. Vice versa, it can be investigated how the VMP-based CBMP method and techniques could be useful for Business/Enterprise Architecture practice with TOGAF and ArchiMate.

## **2 Paper Goal**

The goal of the paper is twofold. First, by means of an illustrative example we explore a concrete and recently available opportunity for integration of VMP and ArchiMate. Second, we ponder about the research activities that would be required for investigating such integration. We posit that mapping the artifacts underlying enterprise modeling with VMP and ArchiMate would be required for any kind of integration. The illustrative example shows that this mapping goes beyond a mere comparison of the syntax and semantics of metamodel elements, but also extends to pragmatic aspects like model purpose, choice of diagram types and which information to include in which type of diagram.

Eventually, the form that an integration of VMP and ArchiMate can take, the applications and benefits of such integration, and the research that would be required for establishing and evaluating this integration are open questions for which this workshop paper only intends ‘to scratch the surface’, to stimulate reflection and discussion.

## **3 Illustrative Example – Value Stream Mapping**

As an illustrative example of the convergence of VMP and ArchiMate, the comparison of artifacts of both instruments, and the possible benefits of integration, we focus on the Value Stream element, which is the only new element added to the ArchiMate metamodel, in its recent (November 2019) upgrade from Version 3.0.1 to Version 3.1.

### **3.1 Value Stream Modeling with VDML**

OMG’s VDML includes amongst its purposes the support of value stream analysis to address customer values. VDML defines a value stream as “the network of activities that includes resources, value contributions and capabilities to determine a value proposition for a customer who may be the ultimate customer or an internal end user of the result” [13] (p. 99). It is also stated that “a value stream can be identified within a VDML model as the network of capabilities and their activities that contribute to the values and deliverables identified in a value proposition” [13] (p. 108), which signifies that value stream is not a separate element of the VDML metamodel, but refers to a purposefully organized collection of other elements.

In VDML models, value streams have no specific diagram. The diagram that comes most close to the intent of the ‘capabilities-activities-resources-value contributions network’ is the Activity Network Diagram, though its BPMN-like partitioning of activities

in swim-lanes representing roles, introduces organizational aspects (i.e., who is responsible for performing an activity) that do not fit the higher abstraction level of value streams, where the focus is more on what capabilities are required to perform the value stream activities. Roelens and Poels [16] defined a Business Model Viewpoint for VDML that includes a modified Activity Network Diagram, called Value Stream Diagram, in which activities are replaced by the required capabilities (in the form of VDML Capability Methods and Capability Offers), though still maintaining the role partitioning.

### 3.2 Value Stream Design with VMP

The discover stage of the CBMP process includes the creation of Value Stream Maps. A Value Stream Map as supported by VMP is a graphical representation of a value stream, which is composed of activities to be performed in a particular order and the competencies that are needed for performing those activities. Competency is a construct derived from the Business Model Cube concept [11] and can be seen as a generalization of the VDML Capability and Resource elements [15].

Figure 1 shows an example Value Stream Map for the *Flights* value stream by means of which the *Operations* business unit of a Low-cost Carrier (LCC) delivers the *Flights* value proposition to the LCC's *Travel* business unit. Also shown are the competencies (white/solid border: capability, yellow/faded border: resource) that are used by the value stream activities.

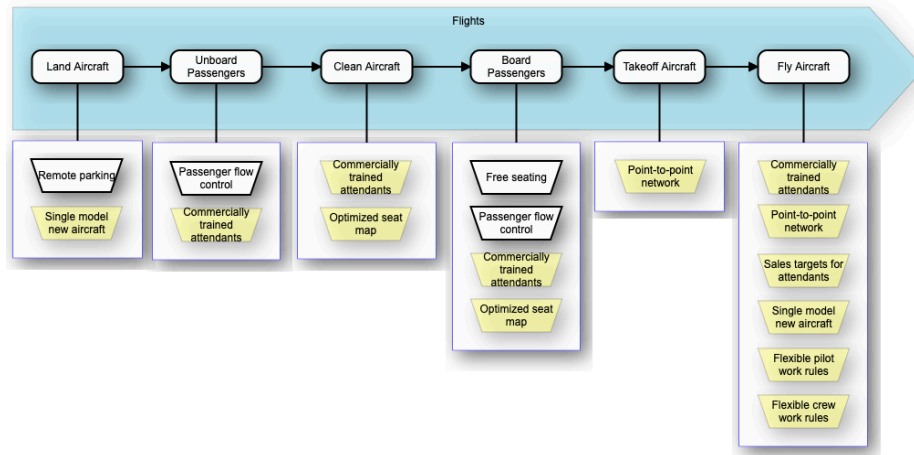
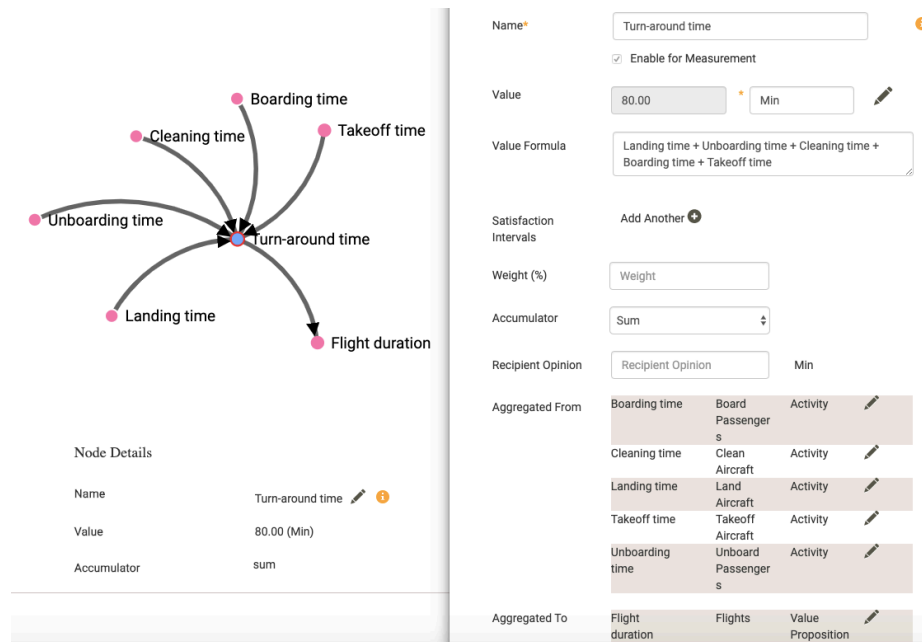


Fig. 1. *Flights* value stream map as in VMP

During both the discover stage and prototype stage of the CBMP process, value stream design can be further completed by deciding for each activity the values they create and the values of value propositions they contribute to. These values instantiate the VDML ValueAdd and ValuePropositionComponent elements, respectively. VDML defines the value contribution of a value stream activity as “the measurable effect of an activity

that affects the level of satisfaction of one or more values in a value proposition” [13] (p. 99). For instance, the Value Aggregation View depicted in the VMP screenshot of Figure 2 shows how the (time) values created by the activities in the *Flights* value stream are aggregated to the *Turn-around time* value of the *Flights* value proposition.



**Fig. 2.** *Turn-around time* value aggregation view as in VMP

Although all information related to value streams as defined by VDML is captured in VMP when performing the CBMP process, a complete representation of a value stream in a single visualization is lacking.<sup>4</sup> The recent addition to ArchiMate of a Value Stream element and definition of a Value Stream Viewpoint opens up possibilities to visualize VMP Value Stream Maps using a widely used enterprise architecture language that is closely associated to TOGAF.

### 3.3 Value Stream Definition and Analysis According to TOGAF

TOGAF, in its Version 9.2, has a clear definition of value streams, the position of value stream maps in business architecture description, the purpose and benefits of value stream analysis, and guiding principles for value stream map creation [21]. Compared to VDML, the differences in definition are minor and from a pragmatic point of view, of no importance. TOGAF refers to value stream activities as value (stream) stages and

<sup>4</sup> It is to be noted that activities in a VMP Value Stream Map are clickable shapes. By clicking the activity shape, details of the activity can be inspected, including the value contributions that have been defined for the activity.

explicitly recognizes processes as means to operationalize these stages. This interpretation of processes is very similar to the intent of the VDML Capability Method element, which defines how an organizational unit delivers a capability. TOGAF's value streams can thus be decomposed into value stages that create incremental values contributing to the value proposition for the stakeholder that initiates or triggers the value stream. Value stages are mapped to business capabilities (as documented in a Business Capability Map) to analyze an enterprise's current and desired ability to deliver the value proposition. Heatmaps can be used to visualize the results of a gap analysis and to direct business transformation initiatives.

### 3.4 Value Stream Modeling with ArchiMate

ArchiMate supports the modeling of value streams through its new Value Stream element (Figure 3). A value stream “represents a sequence of activities that create an overall result for a customer, stakeholder, or end user” [23] (p. 53). Completely in line with both TOGAF and VDML, the stakeholder triggering the value stream may be an external customer (i.e., customer of the enterprise) or an internal customer (i.e., actor within the enterprise like a business unit, department, role, etc.). This stakeholder can be represented using the ArchiMate Stakeholder motivational aspect element, which can be related to the value stream by an ArchiMate Association relationship. ArchiMate does not have a metamodel element to directly represent a value proposition, but using its Value and Outcome motivational aspect elements, an elegant solution can be provided. An outcome may represent any end result (hence also the result of a value stream) and a value may represent the relative worth, utility or importance of any enterprise architecture concept (hence also an outcome). ArchiMate values can thus be related to an outcome (via an Association relationship) to represent the values composing a value proposition, and the outcome can be related (again with an Association relationship) to the stakeholder for whom the value proposition is intended.

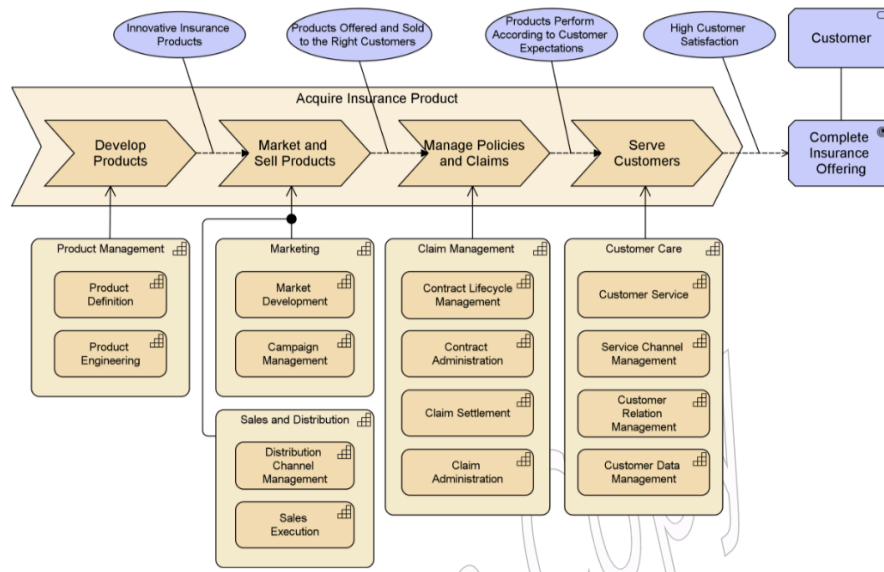


**Fig. 3.** Alternative notations for the Value Stream element in ArchiMate

ArchiMate value streams can be decomposed into other value streams, which can be used to represent value (stream) stages. Each of these value stages can in turn be associated to a value that represents the incremental value obtained after performing the value stage. The value stream itself can be related by an ArchiMate Realization relationship to the outcome that represents the value proposition. Through the ArchiMate Serves relationship, value stream (stages) can be related to capabilities and resources. Alternatively, resources can be assigned to the capabilities that serve the value stream (stages).

Figure 4 shows the value stream example from the ArchiMate 3.1 specification, in which value stages cross-reference capabilities. Value stages are related with ArchiMate Flow relationships, representing in this case value flows as they are associated to

values that represent the value increments resulting from each stage. The flow from the final stage to the outcome is, however, violating the ArchiMate metamodel specification as an ArchiMate Flow relationship cannot be directed from a value stream to an outcome. A correct model would show that the overall value stream realizes the outcome – See Figure 5 for a correct representation.



**Fig. 4.** Value stream with capability cross-mapping (example 22 in [23], p. 56)

The ArchiMate specification also defines a Value Stream Viewpoint that “allows the Business Architect to create a structured overview of a value stream, the capabilities supporting the stages in that value stream, the value created, and the stakeholders involved” [23] (p. 168). Unfortunately, the only elements selected from the ArchiMate metamodel to create views according to this viewpoint are Value Stream, Capability, Stakeholder and Outcome, hence leaving out Value and Resource. Also, at the time of writing, the most recent version of the Archi tool<sup>5</sup> (Version 4.6.0) leaves out these elements from the Value Stream Viewpoint.

The example Flights value stream designed with VMP can be visualized in Archi as in Figure 5. The immediate benefit of such visualization is that all information related to the value stream is captured in one representation. Note that the stakeholder associated to the outcome that is realized by the value stream (i.e., the LCC *Travel* business unit) is the value recipient, whereas the stakeholder that is associated to the value stream (i.e., the LCC *Operations* business unit) contributes to the value creation and delivery. In general, the latter stakeholder could be different for different value stream stages. Note also how the time values contributed by the different value stream stages compose

<sup>5</sup> [www.archimatetool.com](http://www.archimatetool.com)

the time values that are part of the Flights value proposition (i.e., *turn-around time* and *flight duration*). Changes in these activity times will impact the value proposition.

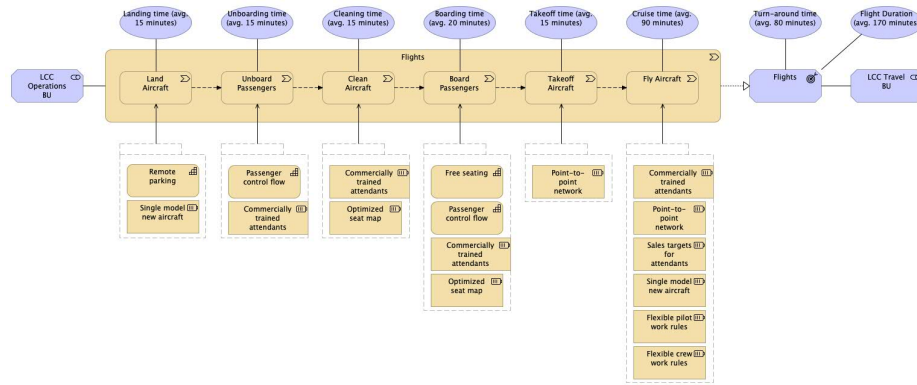


Fig. 5. Flights value stream map as an ArchiMate model

## 4 Discussion

Although VMP and ArchiMate are means targeting different ends, the illustrative example demonstrates a large degree of syntactic and semantic overlap in the modeling artifacts of both instruments. Notational conventions for visualizing value stream maps are clearly related (compare Figures 1 and 5) and, even if not homomorphic, concepts of both metamodels are relatively straightforward to map. Further, ArchiMate value streams, capabilities and resources are all strategy layer elements in the enterprise architecture, reflecting a level of abstraction in modeling common to VMP.

Regarding the possible benefits of integration, we acknowledge that further research is required. The mapping of modeling artifacts opens up avenues for (research on) integration that recognizes the complementary purposes of VMP and ArchiMate in the areas of strategy planning and strategy implementation, respectively. For instance, exporting model results, like a value stream map, from VMP to enterprise architecture tools in a format ‘understood’ by these tools (i.e., ArchiMate) would facilitate designing and deciding on the business, application, data, and technology infrastructures needed to realize the resources and capabilities that are required for delivering value propositions. Of course, this is just one possible application of integration and many more can be discovered, explored and experimented with in future research.

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