

# An Add-In for UN/CEFACT's Modeling Methodology 2.0

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## ABSTRACT

UN/CEFACT's Modeling Methodology (UMM) is a UML based modeling language and has become the method of choice for the modeling of inter-organizational business processes. The complexity of UMM, however, makes it difficult to use for novice modelers. In order to overcome this limitation and to allow for a seamless integration of UMM into any UML modeling tool of choice, we have developed the UMM Add-In. The UMM Add-In builds upon the UML modeling tool Enterprise Architect [5] and assists a business modeler in creating a valid UMM model. Thereby the Add-In consists of a UMM specific tool bar, a quick link feature, and a UMM validator. Using our UMM Add-In even an inexperienced business modeler can quickly create inter-organizational business process models.

## 1. INTRODUCTION

In recent years collaborative business process modeling has become more and more popular. Inter-organizational collaborations have to be maintained and understood among all participating business partners and involved stakeholders. The United Nation's Center for Trade Facilitation and Electronic Business (UN/CEFACT) took up the challenge and started to develop a methodological modeling approach resulting in UN/CEFACT's Modeling Methodology (UMM) [7]. UMM allows the business modeler to model inter-organizational processes independent of the underlying implementation technology - e.g. Web Services or ebXML - following the open-edi standard [3]. The concepts of UMM are realized as a UML profile. UML profiles enable the customization of the popular Unified Modeling Language (UML) [4] and allow to shape the UML to the specific needs of e.g. collaborative B2B.

UMM is a broad approach and therefore holds a high grade of complexity. Hence, the implementation of UMM business models is a challenging task, especially for novice users. In order to foster a better understanding of UMM we have developed a tool called UMM Add-In, supporting the business modeler in creating valid UMM models. Since the theoretical concepts of UMM are realized as a ready-to-use tool, they are easier to perceive for inexperienced modelers. Our current UMM Add-In implementation supports the

UMM 2.0 specification [7]. In the following we highlight the most important features and concepts.

## 2. UN/CEFACT'S MODELING METHODOLOGY

UN/CEFACT's Modeling Methodology (UMM) is defined as a UML profile on top of the UML 2.0 meta model. Using stereotypes, tagged values and OCL constraints the UML meta model is tailored to the specific needs of inter-organizational business process modeling. UMM comprises three distinctive views namely *business requirements view* (BRV), *business choreography view* (BCV), and *business information view* (BIV). Within the *business requirements view* the specific requirements of the business process are captured. Using these requirements the modeler completes the formal representation of the business process in the *business choreography view*. The business documents exchanged in an inter-organizational business process are modeled in the *business information view*.

A UMM model defines an inter-organizational business process from a global perspective and defines a so called business choreography. A business choreography then serves as a template for the participating business partners in order to successfully configure their local IT systems. If each business partner defines his own IT configuration without adhering to a global choreography, the resulting IT system configurations are unlikely to match.

Currently there are two versions of UMM available. UMM 1.0 [6] has already been released as a final specification. The most recent version of UMM is UMM 2.0, being currently under development. The new version of UMM has several enhancements facilitating its use in comparison to the prior version.

## 3. THE UMM ADD-IN 2.0

The UMM Add-In is realized on top of the UML modeling tool Enterprise Architect. Using the API of Enterprise Architect the different features of the Add-In are realized and programmed in .NET C#. The UMM Add-In 2.0 offers three main features: firstly, the UMM specific toolbar integrates the UML profile into Enterprise Architect, secondly, personalized quick links ease the development of UMM models, and finally, a UMM Validator checks the model for UMM 2.0 compliance.

### 3.1 Profile integration

In order to use all the UMM stereotypes defined in the UML profile, it is necessary to integrate these stereotypes into Enterprise Architect. Instead of defining each UMM element by hand, it is more convenient to provide the modeler with a set of predefined modeling elements, according to the UMM specification. In Enterprise

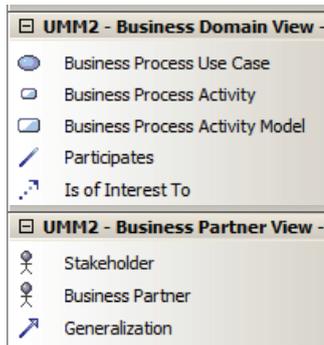


Figure 1: Screenshot of the UML profile

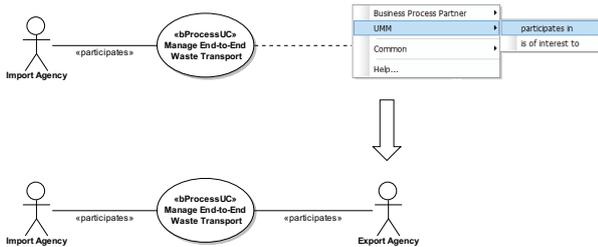


Figure 2: Screenshot of the Quick Link functionality.

Architect the UML profile for UN/CEFACT's Modeling Methodology is presented to the modeler as a dedicated tool-bar. Using the predefined elements from the tool-bar, the modeler can simply drag and drop elements onto the modeling canvas.

Figure 1 shows a cut-out from the UMM specific toolbar within Enterprise Architect. For each view and sub-view in UMM a dedicated compartment in the UMM toolbar is created. On top of figure 1 the relevant artifacts for the *business domain view* are shown and at the bottom those for the *business partner view*. Please note, that due to space limitations not all artifacts are shown in figure 1.

The integration of the UML profile as a specific toolbar is not limited to the UML modeling tool Enterprise Architect. In general the UML profile can be imported into any UML modeling tool of choice, providing the business process modeler with the correct artifacts for each view.

### 3.2 Personalized Quick Links

In order to ease the development of UMM models the UMM Add-In supports the concept of *Quick Links*. Instead of adding new elements and relations by hand, *Quick Links* enable the modeler to create and allocate elements automatically. Additionally a restricted list of valid connection types can be provided depending on the specific context. Figure 2 depicts the business process use case *Manage End-to-End Waste Transport* and its related business partners. As shown on top of figure 2 the modeler may use a context specific menu in order to add a new business partner to the use case. The new business partner is automatically added to the model and the appropriate connection stereotype is set (*participates*). The quick link functionality of the UMM Add-In in particular aids inexperienced users since only valid connection types and elements are proposed by the *Quick Linker*.

### 3.3 UMM Validator

As outlined before, the UMM is defined as a profile on top of the UML 2.0 meta model. Using OCL constraints, tagged values and stereotypes the UML is customized for the specific purpose of business process modeling. Thereby the UMM specification [7] specifically defines the relationships between the different modeling artifacts, which elements are allowed in which view, etc. A UMM model is valid, only in case it does not violate any of the constraints specified in the specification. However, since the UMM specification holds a multitude of different constraints it is very difficult especially for an inexperienced user to follow them all.

During the modeling process, artifacts are created in an iterative manner and often errors occur. The UMM Add-In provides a UMM validator checking the constraints specified in the specification against any given UMM model. In case of factual errors in the model the user is provided with detailed error messages helping to correct the model. In prior publications we have already shown, that a UMM model may also be used to derive deployment artifacts for a service oriented architecture [1] [2]. However, in order to allow for such a derivation mechanism a valid UMM model is a crucial prerequisite, otherwise a derivation algorithm will either fail or generate invalid code.

### 3.4 Conclusion and Outlook

In this paper we have shown how the UMM Add-In supports a business modeler in creating valid UMM models. Thereby the theoretical concepts of UMM, which are hard to conceive for an inexperienced modeler, are realized using a tool support. For the future several extensions of the UMM Add-In are planned. First, the integration of the business document perspective into the UMM Add-In will be of importance. Similar to the concept of UMM and the business process perspective, UN/CEFACT develops a UML profile for the modeling of business documents called UPCC (UML Profile for Core Components). The concepts of the UPCC will also be integrated into the UMM Add-In. Second, the generation of deployment artifacts for service oriented architectures out of UMM models is planned for the future. Finally the development of a registry connector allowing the storage and retrieval from a model repository is planned for the future.

## 4. REFERENCES

- [1] B. Hofreiter and C. Huemer. Transforming UMM Business Collaboration Models to BPEL. In *Proceedings of OTM Workshops 2004*. Springer LNCS, 2004.
- [2] B. Hofreiter, C. Huemer, P. Liegl, R. Schuster, and M. Zapletal. Deriving executable BPEL from UMM Business Transactions. In *Proceedings of the IEEE International Conference on Services Computing (SCC 2007)*. IEEE, 2007.
- [3] ISO. *Open-edi Reference Model*, 2004. ISO/IEC JTC 1/SC30 ISO Standard 14662, Second Edition.
- [4] Object Management Group (OMG). *Unified Modeling Language Specification*, Nov. 2007. Version 2.1.2.
- [5] Sparx Systems. *Enterprise Architect*. Sparx Systems, June 2008.
- [6] UN/CEFACT. *UN/CEFACT's Modeling Methodology (UMM), UMM Meta Model - Foundation Module*, Mar. 2006. Technical Specification V1.0, [http://www.unece.org/cefact/umm/UMM\\_Foundation\\_Module.pdf](http://www.unece.org/cefact/umm/UMM_Foundation_Module.pdf).
- [7] UN/CEFACT. *UN/CEFACT's Modeling Methodology (UMM) Candidate for 2.0 Internal Draft, UMM Meta Model - Foundation Module*, Apr. 2008. Candidate for 2.0.