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UML Profile for UN/CEFACT's Modeling Methodology (UMM)
Base Module
Version 2.0 Technical Specification
2011-04-01

NOT FOR IMPLEMENTATION

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28 **1 About this Document**

29 **1.1 Status of this Document**

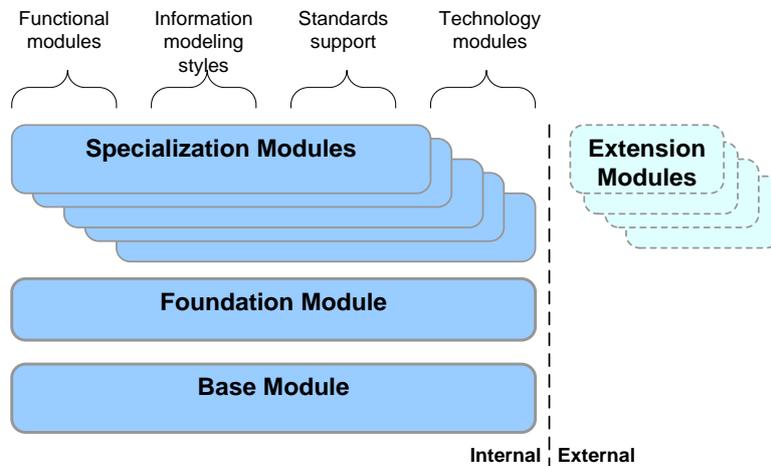
30 This document has completed the Open Development Process (ODP) of UN/CEFACT on 2011-04-01. It is a
 31 UN/CEFACT Technical Specification.

32 **1.2 Revision History**

Version	Release	Date	Comment
Candidate for 2.0	Internal Draft	2008-04-11	
Candidate for 2.0	Public Draft	2008-06-27	
Candidate for 2.0	Implementation verification	2010-01-25	
Version 2.0	Technical Specification	2011-04-01	

33 **1.3 Document Context**

34 The UMM meta model is divided into a set of meta modules. This means the UMM meta model is
 35 partitioned into functional levels, ranging from core, minimal functionality to complete functionality. The
 36 following partition levels have been defined for meta modules:



37
 38 **Figure 1 Module structure of the UMM meta model**

39 **Base:** Covers the fundamental principles that are shared across all of the other modules.

40 **Foundation:** Includes the core concepts of the UMM. In addition, it defines all of the concepts that are used
 41 as part of the minimal methodology to produce a UMM compliant business collaboration model.
 42 Furthermore, it provides fundamental principles which are shared across all of other modules.

43 **Specialization:** Multiple specialization modules might define add-on concepts to the foundation module.
 44 Each specialization module addresses a specialized type of analysis that extends the foundation module at a
 45 well-defined extension point for a specific topic. Specialization modules might become candidates for later
 46 inclusion into the foundation module.

47 **Extension:** Extension modules serve the same purpose as specialization modules. Whereas specialization
48 modules are developed and maintained by UN/CEFACT, extension modules are adding features that are
49 created and maintained by organization(s) which are external to UN/CEFACT.

50 This specification defines the base module of UMM 2.0.

51 **1.4 Conventions**

52 The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED,
53 MAY and OPTIONAL, when they appear in this document, are to be interpreted as described in [RFC2119] as
54 quoted here:

- 55 • MUST: This word, or the terms "REQUIRED" or "SHALL", means that the definition is an absolute
56 requirement of the specification.
- 57 • MUST NOT: This phrase, or the phrase "SHALL NOT", means that the definition is an absolute
58 prohibition of the specification.
- 59 • SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in
60 particular circumstances to ignore a particular item, but the full implications MUST be understood
61 and carefully weighed before choosing a different course.
- 62 • SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED", means that there may exist valid
63 reasons in particular circumstances when the particular behavior is acceptable or even useful, but
64 the full implications should be understood and the case carefully weighed before implementing any
65 behavior described with this label.
- 66 • MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional. One vendor may
67 choose to include the item because a particular marketplace requires it or because the vendor feels
68 that it enhances the product while another vendor may omit the same item. An implementation that
69 does not include a particular option MUST be prepared to interoperate with another
70 implementation which does include the option, though perhaps with reduced functionality. In the
71 same vein an implementation that does include a particular option MUST be prepared to
72 interoperate with another implementation which does not include the option (except, of course, for
73 the feature the option provides).

74

75

76 2 Project Team

77 2.1 Disclaimer

78 The views and specification expressed in this document are those of the authors and are not necessarily
79 those of their employers. The authors and their employers specifically disclaim responsibility for any
80 problems arising from correct or incorrect implementation or use of this technical specification.

81 2.2 Contact

82 Name: Christian Huemer
83 Company: Vienna University of Technology
84 Street: Favoritenstraße 9-11/188-3
85 City, state, zip/other: 1040 Vienna
86 Nation: Austria

87 Phone: +43 1 58801 18882
88 Email: huemer@big.tuwien.ac.at

89 2.3 Project Team Participants

90

91	Project Team Lead:	Christian Huemer	Austria
92	Editing Team:	Jens Dietrich	Germany
93		Birgit Hofreiter	Austria
94		Christian Huemer	Austria
95		Philipp Liegl	Austria
96		Glenn Miller	Canada
97		Harry Moyer	Australia
98		Rainer Schuster	Austria
99	Marco Zapletal	Austria	

100

101

102	Contributors:	Steve Capell	Australia
103		Sylvie Colas	France
104		Barbara Flügge	Switzerland
105		William McCarthy	USA
106		Thomas Motal	Austria
107		Christian Senf	Germany
108		Nita Sharma	USA
109		Kees Sparreboom	Nederlands
110		Gunther Stuhec	Germany

111 The Editing Team of this UMM base module likes to thank former members of TMG's Business Process
112 Working Group (BPWG) who have spent enormous efforts in putting the UMM into a stage that we were
113 able to build upon in order to create this base module.

114

115 3 Introduction

116 3.1 Audience

117 A reader of the document must have a deep understanding of UML 2.1.2. She or he must be able to
118 understand meta models denoted as UML class diagrams. She or he should be familiar with the UML 2.1.2.
119 meta model, at least she or he must be able to check back the UML 2.1.2. meta model. The reader should be
120 familiar with OCL 2.0 in order to understand the OCL constraints of this UMM profile – those who are not
121 familiar with OCL are provided with a plain text description of the constraint.

122 The information described in this manual is aimed at

- 123 • advanced business process modelers that verify a UML model for UMM compliance (if not supported
124 by a tool)
- 125 • advanced business process modelers who train other business process modelers and business
126 process analysts
- 127 • software designers who want to produce UML tools providing support for this UMM foundation
128 module
- 129 • software designers who want to produce tools to transform UMM compliant business collaboration
130 models into specifications of the IT-layer (ebXML, Web Services, UN/EDIFACT, etc.).
- 131 • software designers who want to produce repositories to register UMM compliant business
132 collaboration models

133 3.2 Related Documents

- 134 • **UN/CEFACT**
 - 135 ○ UN/CEFACT Open Development Process (TRADE/R.650/Rev.4/Add.1/Rev.1 - 19 April 2007)
136 http://www.unece.org/cefact/cf_plenary/plenary07/trd_R650_Rev4_A1E.pdf
 - 137 ○ UPCC 1.0 - UML Profile for Core Components
138 <http://unstandards.org:8080/display/public/UPCC+-+UML+Profile+for+Core+Components>
 - 139 ○ Core Component Technical Specification
140 http://www.unece.org/cefact/ebxml/CCTS_V2-01_Final.pdf
 - 141 ○ Core Component Message Assembly
142 <http://www.unstandards.org:8080/display/public/CCMA+-+ODP+3+-+1st+Working+Draft>
- 143 • **International Organization for Standardization (ISO)**
 - 144 ○ Open-edi Reference Model. ISO/IEC 14662
145 [http://standards.iso.org/ittf/PubliclyAvailableStandards/c037354_ISO_IEC_14662_2004\(E\).zip](http://standards.iso.org/ittf/PubliclyAvailableStandards/c037354_ISO_IEC_14662_2004(E).zip)
- 146 • **Object Management Group (OMG)**
 - 147 ○ Unified Modeling Language Specification (UML), Version 2.1.2
148 <http://www.omg.org/docs/formal/07-02-05.pdf>

150

151 3.3 UN/CEFACT's Modeling Methodology (UMM): Overview

152 UN/CEFACT's Modeling Methodology (UMM) is a UML modeling approach to design the business services
153 that each partner must provide in order to collaborate. It provides the business justification for the services
154 to be implemented in a service-oriented collaboration architecture. Thus, a primary vision of UN/CEFACT is
155 to capture the business knowledge that enables the development of low cost software based on service-
156 oriented architectures (SOA) helping the small and medium size companies (SMEs), as well as emerging
157 economies, to engage in e-Business practices. UMM focuses on developing a global choreography of inter-
158 organizational business processes and their information exchanges. UMM models are notated in UML syntax
159 and are platform independent models. The platform independent UMM models identify which services need
160 to be realized in a service-oriented architecture, in order to implement the business collaboration. This
161 approach provides insurance against technical obsolescence.

162 The UMM, as described in this document, is the formal description technique for describing any Open-edi
163 scenario as defined in ISO/IEC 14662 "Open-edi reference model". An Open-edi scenario is a formal means
164 to specify a class of business transactions having the same business goal, such as, purchasing, or inventory
165 management. The primary scope of UMM is the Business Operations View (BOV) and not the Functional
166 Service View (FSV) as defined in ISO/IEC IS 14662. The BOV is defined as "a perspective of business
167 transactions limited to those aspects regarding the making of business decisions and commitments among
168 organizations", while the FSV is focused on implementation specific, technological aspects of Open-edi. The
169 commitments of the BOV layer are reflected in the choreography of the inter-organizational business
170 processes and their information exchanges. At the FSV layer, this choreography must be implemented by a
171 set of composite services. Therefore it follows, that UMM, which targets the BOV layer, defines what the
172 business is about; and the technologies on the FSV layer define how to implement the business by a service-
173 oriented architecture.

174 This version of the UMM consists of three views each covering a set of well defined artifacts:

- 175 • Business Requirements View (bRequirementsV)
- 176 • Business Choreography View (bChoreographyV)
- 177 • Business Information View (bInformationV)

178

179 **Business Requirements View (bRequirementsV):** The Business Requirements View is used to gather existing
180 knowledge. It identifies the business processes in the domain and the business problems that are important
181 to stakeholders. It is important at this stage that business processes are not constructed, but discovered.
182 Stakeholders might describe intra-organizational as well as inter-organizational business processes. All of this
183 takes place in the language of the business experts and stakeholders. The business requirements view results
184 in a categorization of the business domain (manifested as a hierarchical structure of packages) and a set of
185 relevant business processes (manifested as use cases). The result may be depicted in use case diagrams. In
186 order to model the dynamics of each business process, one may use a Business Process Activity Model, or a
187 Sequence Diagram, which would be placed beneath the Business Process Use Case. As a practical note, the
188 Business Process Activity Model may depict a process or processes which involve one or more Business
189 Partners. A Sequence Diagram will depict information exchanges between two or more Business Partners.
190 The Business Partners are described within their own package (Business Partner View). A Business Process
191 Activity Model may show state changes to Business Entities. Business Entities are "real-word" things having
192 business significance and are shared among the business partners involved in the collaboration. The Business

193 Entities and their lifecycles of state changes are modeled in the Business Entity View. Furthermore, the
194 Business Entity View also contains one or more packages which represent the conceptual data structures of
195 the Business Entities.

196 **Business Choreography View (bChoreographyV):** The Business Choreography View is used to define and
197 document the global choreography between collaborating business partners in an inter-organizational
198 business process. Within the Business Choreography View, the Business Transaction View contains and
199 documents the requirements of Business Transaction Use Cases, and their participating Authorized Roles.
200 The dynamics of a Business Transaction Use Case are described by a Business Transaction. A business
201 transaction defines a simple choreography of exchanging business information between two authorized
202 roles and an optional response. A business transaction identifies the business actions of each partner
203 responsible for sending and receiving the business information. These actions correspond to the
204 requirements of any solution that must be implemented on each business partner's side in a service-
205 oriented collaboration architecture. Within the Business Choreography View, the Business Collaboration
206 View contains and documents the requirements of Business Collaboration Use Cases and their participating
207 Authorized Roles. The dynamics of a Business Collaboration Use Case are described by a Business
208 Collaboration Protocol. A Business Collaboration Protocol choreographs the flow among business
209 transactions, and/or nested Business Collaboration Protocols. This flow depends on the states of business
210 entities. When a Business Collaboration Use Case is identified, but different sets of parties may execute this
211 collaboration, the different Realizations (executions) may be modeled within the Business Realization View,
212 as a Business Realization Use Cases.

213 **Business Information View (bInformationV):** An execution of a business transaction usually results in the
214 change of state of one or more business entities. Thus, the information exchanged in a transaction should be
215 limited to the minimum information needed to change the state of a business entity. Nevertheless, UMM
216 allows the definition of an information exchange in a document-centric approach – even if this is not
217 recommended. A Business Information View contains Business Information Artifacts. UMM does not
218 mandate a specific Business Information Modeling approach. However, UMM strongly recommends that
219 Business Information is modeled in accordance to UN/CEFACT's Core Components Technical Specification
220 and Message Assembly Guidelines. In order to model Core Components by means of UML, UN/CEFACT
221 provides the Profile for Core Components (UPCC).

222 3.4 Objectives

223 3.4.1 Goals of the Technical Specification

224 The goals of this specification are:

- 225 • To define a set of data types that may be shared between the UMM Foundation module and
226 different UMM Specialization modules
- 227 • To define the fundament on which constitutive UMM specifications may based upon.

228 3.4.2 Requirements

229 This specification is guided by the following key requirements derived from the above goals:

- 230 • The UMM Base module contains only stereotypes that are currently used in the UMM Foundation
231 module or in a UMM specialization and extension modules
- 232 • Today, the UML is the most commonly supported modeling language by modeling tools. In order to
233 use the broad range of tools, a UMM model must be a special kind of UML model. Thus, the UMM

234 base module is based on the UML meta model. In fact, it provides a UML Profile consisting of
235 stereotypes, tag definitions and constraints.

236 3.4.3 Caveats and Assumptions

237 This specification makes the following assumptions:

- 238 • This UML profile is based on the UML meta-model version 2.1.2. This version is the current OMG
239 version. Using another UML meta-model as a basis for the development of a UMM compliant
240 business collaboration model may not deliver correct results.
- 241 • The basic concepts of the UMM and the way they relate to each other are described and explained
242 by means of a meta model (to be found in the non-normative “conceptual description” sections of
243 this document).

244 3.5 Structure of the UMM Base Module

245 The UMM base module provides common data types, which may be used by the UMM foundation module
246 or by other specialization and extension modules. This version of the base module consists of three artifacts
247 named “*bInformation*” (BusinessInformation), “*InfEnvelope*” (InformationEnvelope) and “*bLibrary*” (Business
248 Library).

249 A *business library* is realized as a package. Elements which inherit from a *business library* (or subtypes of it),
250 are candidates for registration in a registry. A *business library* therefore acts as container for elements,
251 which should be registered and retrieved together to be semantically complete.

252 *BusinessInformation* is realized as a class and represents the abstract concept of a business document
253 exchanged in a business transaction between two business partners. In order to allow for an arbitrary
254 *business information* to be exchanged in a UMM business transaction, the UML class based business
255 information representation must inherit from a *BusinessInformation* or subtypes thereof.

256 An *InformationEnvelope* is a subtype of a *BusinessInformation* and represents a concrete business message
257 which is exchanged in a UMM business transaction.

258

259

260 **4 UMM Base Module**

261 **4.1 Abbreviations of Stereotypes**

Stereotype Abbreviation	Full Stereotype Name
bInformation	BusinessInformation
bLibrary	BusinessLibrary
InfEnvelope	InformationEnvelope

262

263 **4.2 Stereotypes and Tag Definitions (normative)**

264

265

266

Figure 2 UMM Base Module – Abstract Syntax

Stereotype		bLibrary (BusinessLibrary, abstract)	
Base Class	Package		
Parent	-		
Description	A business library is a container for objects, which together build a semantic unit.		
Tag Definition	businessTerm		
	Type	String	
	Multiplicity	0..*	
	Description	A business term is a synonym, by which a business entity is commonly known.	

copyright	
Type	String
Multiplicity	0..*
Description	Holds information about the copyright of a business library.
owner	
Type	String
Multiplicity	0..*
Description	The owner of the business library, who might be an organization, an institution or an individual.
reference	
Type	String
Multiplicity	0..*
Description	Identifies references to additional resources, where continuative information about the business library could be found.
status	
Type	String
Multiplicity	0..1
Description	An indicator for the current lifecycle status of an object if the object is registered in a registry. If so, the status must be set by the registry.
uniqueIdentifier	
Type	String
Multiplicity	1
Description	A unique identifier uniquely represents a business library if it is stored in a registry. There are no specific rules for the structure of the identifier; however the preferred identification scheme is the ITU-T Rec. X.667 ISO/IEC9834-8 Universally Unique Identifier (UUID) scheme. Implementers are free to use this scheme, or choose any other structure scheme, providing it guarantees uniqueness within the library to which it belongs.
versionIdentifier	
Type	String
Multiplicity	1
Description	A unique identifier representing the version of a business library if it is stored in a registry. There are no specific rules for the structure of the identifier; however the preferred identification scheme is the ITU-T Rec. X.667 ISO/IEC9834-8 Universally

267

		Unique Identifier (UUID) scheme. Implementers are free to use this scheme, or choose any other structure scheme, providing it guarantees uniqueness within the library to which it belongs.
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268

Stereotype	bInformation (BusinessInformation)
Base Class	Class
Parent	-
Description	A <i>BusinessInformation</i> realizes abstract business document information that is exchanged between authorized roles performing activities in a business transaction. Since a <i>BusinessInformation</i> is defined as abstract it cannot be used directly in order to set the type of exchanged information in a <i>BusinessInformation</i> . Instead the concept of an <i>InformationEnvelope</i> is used.

269

Stereotype	InfEnvelope (InformationEnvelope)
Base Class	Class
Parent	-
Description	An <i>InformationEnvelope</i> is a subtype of a <i>BusinessInformation</i> and represents a concrete business message which is exchanged in a UMM business transaction. Any business document artifacts are connected to an <i>InformationEnvelope</i> using associations.

270

4.3

271 **Copyright Statement**

272

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274 This document and translations of it may be copied and furnished to others, and derivative works that
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