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AND ELECTRONIC BUSINESS (UN/CEFACT)

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

**NOT FOR IMPLEMENTATION**

1	<b>Table of Contents</b>	
2	Table of Contents .....	2
3	1 About this Document .....	3
4	1.1 Status of this Document .....	3
5	1.2 Revision History .....	3
6	1.3 Document Context .....	3
7	1.4 Conventions.....	4
8	2 Project Team.....	5
9	2.1 Disclaimer .....	5
10	2.2 Contact .....	5
11	2.3 Project Team Participants .....	5
12	3 Introduction.....	6
13	3.1 Audience.....	6
14	3.2 Related Documents .....	6
15	3.3 UN/CEFACT’s Modeling Methodology (UMM): Overview .....	7
16	3.4 Objectives .....	8
17	3.4.1 Goals of the Technical Specification.....	8
18	3.4.2 Requirements .....	8
19	3.4.3 Caveats and Assumptions.....	9
20	3.5 Structure of the UMM Base Module .....	9
21	4 UMM Base Module.....	10
22	4.1 Abbreviations of Stereotypes .....	10
23	4.2 Stereotypes and Tag Definitions (normative) .....	10
24	Copyright Statement .....	13
25		
26		
27		

28 **1 About this Document**

29 **1.1 Status of this Document**

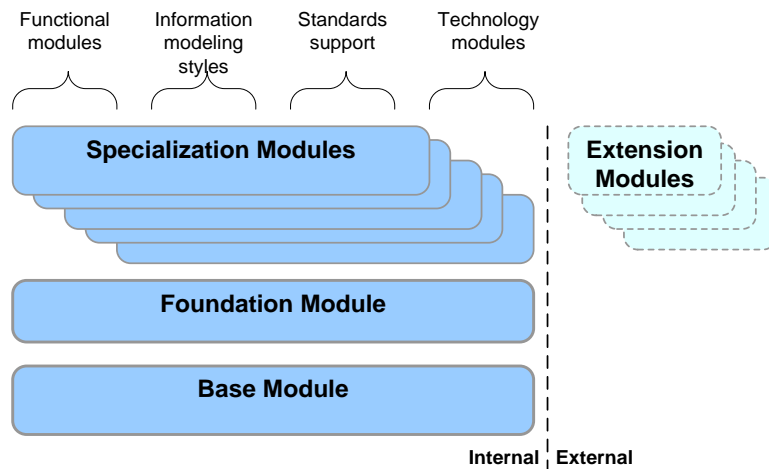
30 This document has completed the Open Development Process (ODP) of UN/CEFACT on 2011-04-01. It is a  
 31 UN/CEFACT Technical Specification.

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.

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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](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](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>

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### 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)**

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265

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Figure 2 UMM Base Module – Abstract Syntax

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

<b>copyright</b>	
<b>Type</b>	String
<b>Multiplicity</b>	0..*
<b>Description</b>	Holds information about the copyright of a business library.
<b>owner</b>	
<b>Type</b>	String
<b>Multiplicity</b>	0..*
<b>Description</b>	The owner of the business library, who might be an organization, an institution or an individual.
<b>reference</b>	
<b>Type</b>	String
<b>Multiplicity</b>	0..*
<b>Description</b>	Identifies references to additional resources, where continuative information about the business library could be found.
<b>status</b>	
<b>Type</b>	String
<b>Multiplicity</b>	0..1
<b>Description</b>	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.
<b>uniqueIdentifier</b>	
<b>Type</b>	String
<b>Multiplicity</b>	1
<b>Description</b>	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.
<b>versionIdentifier</b>	
<b>Type</b>	String
<b>Multiplicity</b>	1
<b>Description</b>	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)
<b>Base Class</b>	Class
<b>Parent</b>	-
<b>Description</b>	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)
<b>Base Class</b>	Class
<b>Parent</b>	-
<b>Description</b>	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.

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4.3

271 **Copyright Statement**

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274 This document and translations of it may be copied and furnished to others, and derivative works that  
275 comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and  
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