



UN/CEFACT

United Nations Centre for Trade Facilitation and Electronic Business

Techniques and Methodologies
Group (TMG)

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

1	Table of Contents	
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**

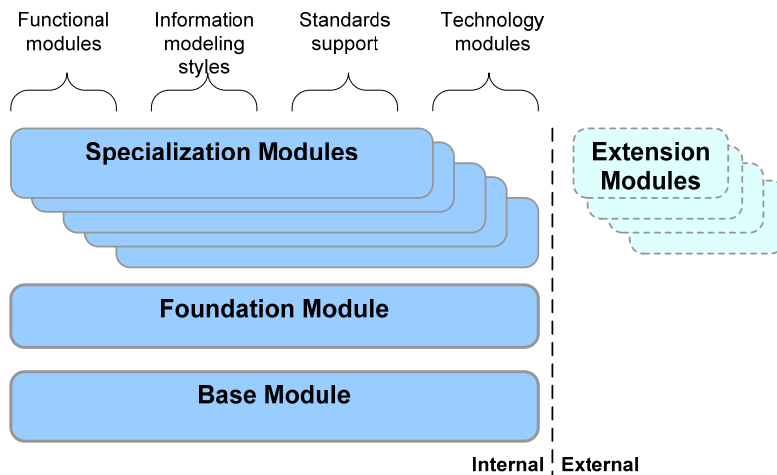
30 This document has completed the Open Development Process (ODP) of UN/CEFACT on 2011-04-01. It is a
31 UN/CEFACT Technical Specification.

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	

34 **1.3 Document Context**

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



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

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

51 This specification defines the base module of UMM 2.0.

52 1.4 Conventions

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

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

75

76

77 **2 Project Team**

78 **2.1 Disclaimer**

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

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

115

116 3 Introduction

117 3.1 Audience

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

123 The information described in this manual is aimed at

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

134 3.2 Related Documents

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

151

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

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

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

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

- Business Requirements View (bRequirementsV)
- Business Choreography View (bChoreographyV)
- Business Information View (bInformationV)

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

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

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

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

223 3.4 Objectives

224 3.4.1 Goals of the Technical Specification

225 The goals of this specification are:

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

229 3.4.2 Requirements

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

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

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

237 3.4.3 Caveats and Assumptions

238 This specification makes the following assumptions:

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

245 3.5 Structure of the UMM Base Module

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

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

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

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

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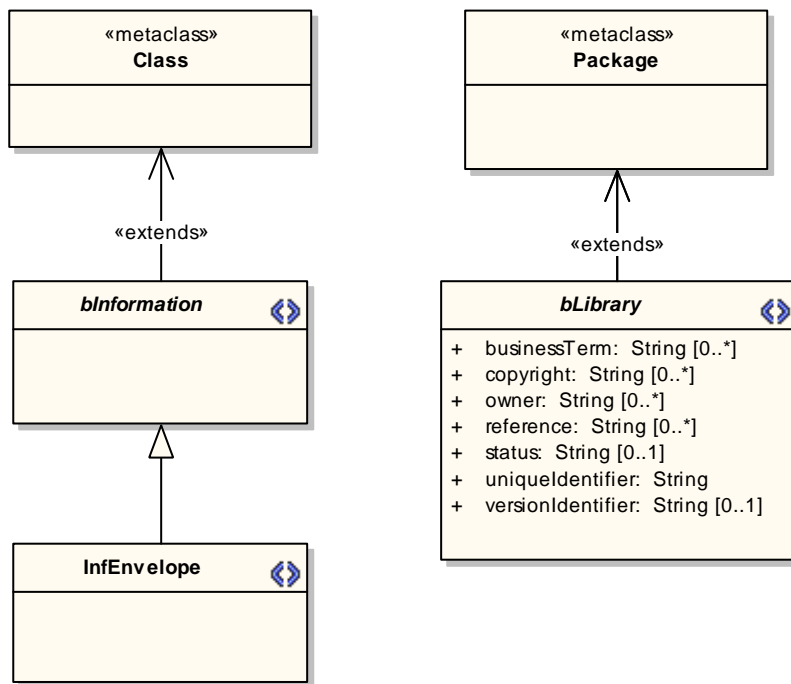
261 **4 UMM Base Module**

262 **4.1 Abbreviations of Stereotypes**

Stereotype Abbreviation	Full Stereotype Name
bInformation	BusinessInformation
bLibrary	BusinessLibrary
InfEnvelope	InformationEnvelope

263

264 **4.2 Stereotypes and Tag Definitions (normative)**



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266

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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

268

		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.
--	--	---

269

Stereotype	blInformation (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.

270

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.

271

272 **Copyright Statement**

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274 Copyright © UN/CEFACT 2007. All Rights Reserved.

275 This document and translations of it may be copied and furnished to others, and derivative works that
276 comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and
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286 MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

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