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UN/CEFACT

United Nations Centre for Trade Facilitation and Electronic Business

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UN/CEFACT Modeling Methodology (UMM) User Guide

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84 **1.0 About this Document**

85 **1.1 Development Status**

86 This user guide is approved after completion of the *TMG* review process which ended 9/21/2003.
87 See 2.3 for a high level description of the UMM.

88 **1.2 Caveats and Assumptions**

89 **Applicable UMM-MM Version:**

90 Examples and descriptions provided were developed from the *UMM Meta-Model* (see Normative
91 References).

92 **Library Support**

93 Use of the UMM assumes the availability of supporting Business Content Libraries:

- 94 Business Entity Types Library
- 95 Business Collaboration Patterns Library
- 96 Core Components Library
- 97 Business Object Library

98 In the event libraries such as those listed are not available, or the contents of such libraries do not
99 adequately support a business collaboration to be modeled with reusable models, this user guide
100 provides the procedures necessary to develop all required business process and information
101 models.

102 **Normative**

103 The *UMM User Guide* is a non-normative document, which means that it does not provide a
104 definitive (from the *UN/CEFACT TMG* point of view) specification of the UMM. The user guide
105 may not always provide definitive answers or go into the detail required. In such cases, you will
106 need to refer to the *UN/CEFACT TMG* specifications (see Normative References), links, and
107 references included in the user guide.

108 The examples and other explanatory material in this document are provided to assist in the
109 understanding of the UMM, but they may not always provide definitive answers. Additional
110 reference to the various specifications listed in the Normative References may be required.

111 **Required Tools and Syntax**

112 A Business Expert will use worksheets to capture relevant information, according to the *UMM*
113 *Meta-Model*. Technical Modelers will transform the information in the worksheets into UMM
114 compliant models, using a UML tool and the (graphical) syntax of UML.

115 **1.3 Basics about the *UMM USER GUIDE***

116 **Level of Understanding**

117 The UMM is targeted to the Modelers and Facilitators working with the business experts to extract
118 their business knowledge. They need a high-level understanding of the concepts behind OO
119 modeling, business process modeling, and some rudimentary knowledge of UML in order to
120 utilize the UMM. See [Normative References - Fowler](#).

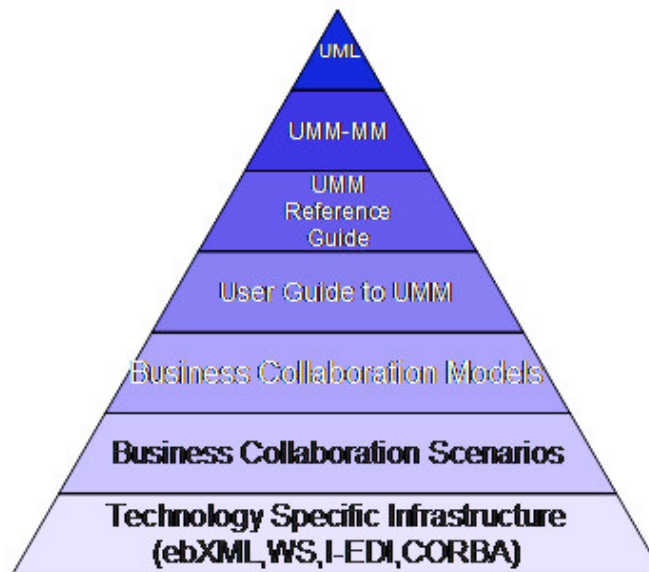
121 The *UMM User Guide* provides a high level description of the UMM. Readers of the user guide
122 should have an understanding of these basic UML diagrams:

- 123 Use Case Diagrams
- 124 Activity Diagrams showing Object Flows
- 125 Class Diagrams.

126

127 **Modeling Approach**

128



129

130

Figure 1 Coupling of Modeling Artifacts to UMM

131 The *UMM User Guide* employs a “step by step” approach, through the use of worksheets, to
 132 capture the business knowledge from business experts in non-technical terms, independent of
 133 any specific modeling tool. At the same time, the *UMM User Guide* provides an easily
 134 approachable description of the UMM using these same basic steps. The user guide presents a
 135 top-down approach. The user guide should be used alongside the formal descriptions of the UMM
 136 and its supporting specifications (see Normative References).

137 **Document Structure**

138 Each major section of the *UMM User Guide* outlines the process of using the UMM to develop
 139 Business Collaboration Framework worksheets and models.

140 **Section 2.0** is a brief overview of the major concepts needed to understand the UMM and the
 141 role of participants involved in using this methodology. It describes the worksheet methodology,
 142 which employs a “top-down” approach to capture and organize the information needed to produce
 143 the UMM models. In addition, it provides a brief overview of who is involved in the UMM
 144 processes at various points in the exercise.

145 **Sections 3.0 through 6.0** cover the step by step approach to working through the UMM to derive
 146 the information that will be used in each subsequent step and ultimately models that can be used
 147 to implement systems and services.

148 The **Appendix A, REA Overview**, provides supplemental information to understand concepts in
 149 regard to completing the REA Worksheet.

150 The **Appendix B, UMM Worksheet Example**, provides a very simple example, “Order from
 151 Catalog”.

152 The **Appendix C, Data Types and Notation**, provides supplemental information to understand
 153 concepts discussed in this document.

154

155 **2.0 Overview of the UMM**

156 **2.1 UMM Objectives**

157 United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) has
158 developed the UMM which:

159 Has a comprehensive business process and business information meta-model as well as a
160 comprehensive process analysis methodology.

161 Retains business acumen that is reusable over generations of implemented technology

162 Provides a methodology and supporting components to capture business process
163 knowledge, independent of the underlying implemented technology

164 Helps discover and define a set of reusable process and information descriptions. Patterns
165 help enforce consistent, reproducible results from the UMM-MM across business domains
166 and their business domain experts and analysts

167 Implements processes that help insure predictable results from a software project

168 ➤ Facilitates the specification of reusable/reproducible process models, in objects and
169 interface-specific object behavior descriptions that are technology and protocol in-
170 sensitive.

171 ➤ Focuses on technology and protocol independent steps of a software engineering
172 process.

173 Is an extension of UML

174 ➤ Is a UML profile used to describe the UMM components to specify the business do-
175 main specific stereotyping that supports a complete business process and informa-
176 tion definition to describe and analyze individual business processes.

177 Structures the Business Operational View (BOV) of the Open-edi Reference Model into
178 layers of "views".

179 The UMM can be employed by business analysts to define external and internal Business
180 Collaboration Frameworks. The UMM can be used to define the Business Collaboration
181 Framework implemented between two or more parties. The UMM can be employed from the top-
182 down or bottom-up or using both approaches simultaneously. The end result of an integrated use
183 of the UMM would be a defined Business Collaboration Framework.

184

185 **2.2 Basic Concepts**

186 A business environment may be large and complex. Any basic understanding of this environment
187 begins with information and documentation. The UMM is an incremental business process and
188 information model construction methodology that provides levels of specification granularity
189 suitable for communicating the model to business practitioners, business application integrators,
190 and network application solution providers. The UMM provides the conceptual framework to
191 communicate common concepts.

192 The following are basic UMM concepts that one should become familiar with before proceeding
193 further. These and other concepts and terms are defined in the official [UN/CEFACT Electronic
194 Business Glossary \(UEB\)](#).

195 **Industry Expert**

196 **Business Expert**

197 **Business Stakeholder**

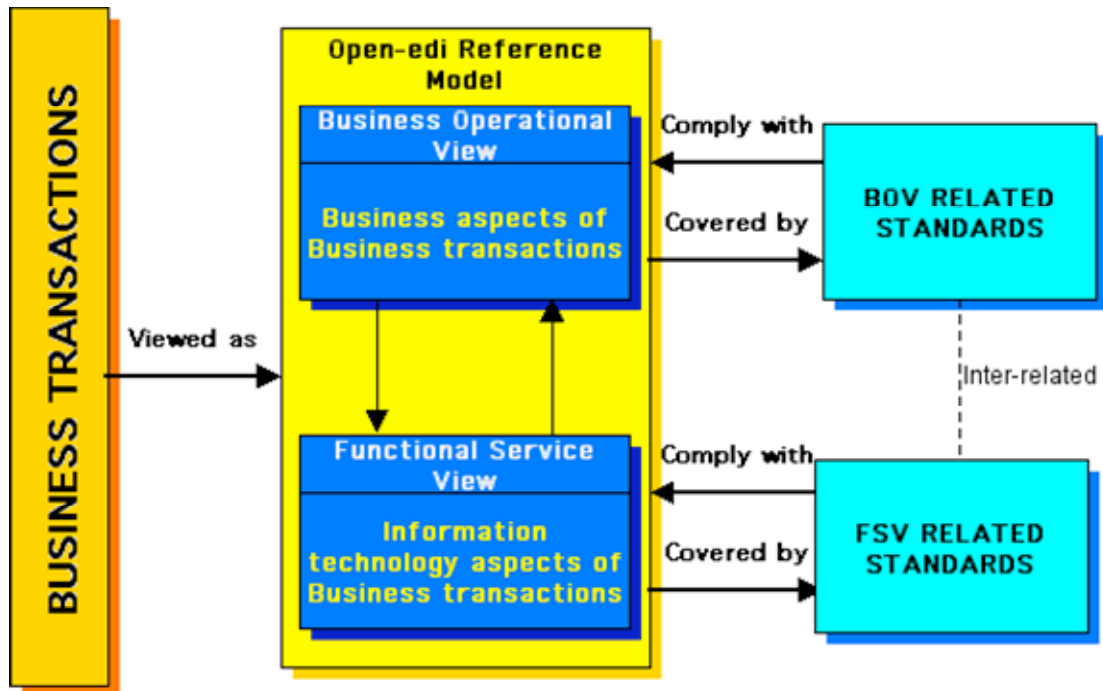
198 **Business Domain**

199 **Business Process**

- 200 **Business Collaboration**
- 201 **Business Process Activity**
- 202 **Business Collaboration Activity**
- 203 **Business Interaction Activity**
- 204 **Business Information**
- 205 **Business Collaboration Domain**
- 206 **Business Collaboration Model** composed of:
 - 207 **Business Process Model**
 - 208 **Information Model**
 - 209 **Business Collaboration Pattern**
 - 210 **Business Entity**
 - 211 **State**
 - 212 **State Transition**
 - 213 **Event**
 - 214 **Life Cycle**
 - 215 **Business Transactions**
 - 216 **Business Information**
 - 217 **Business Object**
- 218 **Open-edi Scenario**
- 219

220 **2.3 UMM Layers the BOV**

221 The UMM is the formal methodology for describing any Open-edi scenario as defined in ISO/IEC
222 14662, Open-edi Reference Model. The Open-edi Reference Model is depicted in Figure 2.
223 Examples of an Open-edi scenario are purchasing and inventory management. The primary
224 scope of the UMM is to provide "a perspective of business transactions limited to those aspects
225 regarding the making of business decisions and commitments among Persons, which are needed
226 for the description of a business transaction". The UMM provides a procedure for specifying
227 (modelling) collaborative business processes (= business collaborations) involving information
228 exchange in a technology-neutral, implementation-independent manner.



229

230

Figure 2 Open-edi Reference Model

231 Specifications related to the Open-edi Functional Service View are mostly outside the scope of
 232 the UMM. Hence, the BOV of a process defines the requirements placed on the information
 233 technology products and services chosen to implement the process described by the Open-edi
 234 scenario.

235 The UMM uses four (4) primary views for structuring modeling activities, all of which are
 236 contained within the BOV. The UMM is organized into the following views so that each business
 237 process and information model can be viewed from a number of perspectives. Each view is briefly
 238 described as follows:

239 The Business Domain View (BDV) - the partitioning of business domain into business areas,
 240 process areas, and business processes. This view establishes the business context of the
 241 process which is a precursor to evaluating the likelihood of finding reusable, previously
 242 defined, process descriptions or terminology in the UMM libraries.

243 The Business Requirements View (BRV) - the view of a business process model that
 244 captures the business scenarios, inputs, outputs, constraints and boundaries for business
 245 processes and their interrelationships within business process collaborations. This view is
 246 how the business domain expert sees and describes the process to be modelled. The BRV is
 247 expressed in the language and concepts of the business domain expert.

248 The Business Transaction View (BTV) - the view of a business process model that captures
 249 the semantics of business information entities and their flow of exchange between roles as
 250 they perform business activities. This view is an elaboration on the business requirements
 251 view by the business analyst and is how the business analyst sees the process to be
 252 modelled. This view uses the language and concepts of the business analyst to convey
 253 requirements to the software designer and the business domain expert.

254 The Business Service View (BSV) - the view of a business process model that specifies the
 255 component services and agents and their message (information) exchange as interactions
 256 necessary to execute and validate a business collaboration. The BSV is expressed in the
 257 language and technical concepts of the software developer.

258 The modeler sees all the views and is responsible for documenting each view in UML and
259 preparing the output from one view for input to the next. Each UMM view produces a set of UMM
260 models (deliverables) that are used as input to subsequent workflows.

261 The participants in the four UMM views are identified in the following. Depending upon the view,
262 the roles could be played by different participants

- 263 1. Business Domain View (BDV) Modelling:
 - 264 a. *Business stakeholders*: Executive Management, Business Owners
 - 265 b. *UMM modelers*: Business Analysts, Business Architects
- 266 2. Business Requirements View (BRV) Modeling:
 - 267 a. *Business stakeholders*: Executive Management, Business Owners, Information
268 Modelers, Process Modelers
 - 269 b. *UMM modelers*: Business Analysts, Business Modelers
- 270 3. Business Transaction View (BTV) Modeling:
 - 271 a. *Business stakeholders*: Business Analysts, Systems Architects, Implementers
 - 272 b. *UMM modelers*: Information Modelers, Process Modelers
- 273 4. Business Service View (BSV) Modeling:
 - 274 a. *UMM modelers*: derived from BTV UMM models

275 **2.4 Business Modeling using UMM**

276 The UMM specifies all information that needs to be captured during the analysis of an electronic
277 commerce based business process. The UMM defines the modelling methodology and resulting
278 artefacts for use when analysing and defining a business process.

279 Within this user guide, Business Process and Business Information Analysis Worksheets are
280 used as simple business process aids to capture business process and business information
281 requirements. The worksheets and corresponding usage methodology are derived from the UMM.
282 The worksheets can be extended for specific vertical industry needs.

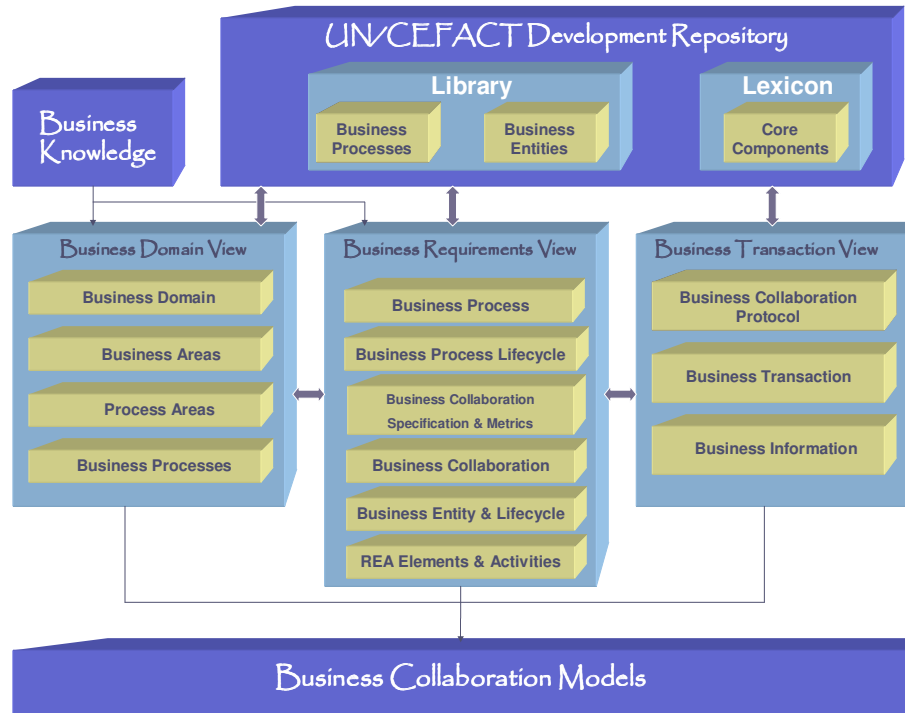
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284 **3.0 Modeling using the UMM**

285 The *UMM User Guide* illustrates a simplified overview of the use of the UMM. This overview is
286 provided through the definition of 3 major work areas corresponding to the first 3 UMM views, i.e.,
287 Business Domain View (BDV), Business Requirements View (BRV) and Business Transaction
288 View (BTV). Procedures within each of these work areas describe how to populate the
289 worksheets. The worksheets help collect and organize the information needed to produce the
290 minimum UMM models for that work area.

291 The 4th UMM view, the Business Service View (BSV) models are not defined in the *UMM User*
292 *Guide* as a work area, as these can be determined as a result of completing the procedures
293 outlined in each of the preceding work areas.

294 Each *UMM User Guide work area* is composed of a set of procedures which build on each other
295 to define the minimum required UMM models for these 3 views. These procedures are based on
296 use of the worksheets that are used to create UMM models. A high-level overview of these
297 worksheets and models can be seen in Figure 3.



298
299 **Figure 3 Overview of UMM Worksheets and Models**

300

301 Refer to the *UMM Implementation Guide* (to be developed) for the necessary guidance to provide
302 the production rules that transform UMM models to:

303 Executable application software for the Business Service Interface

304 Business document payloads in the required specific messaging technology syntax.

305

306

307 **3.1 UMM Modeling Approach**

308 **Top-Down**

309 Building a UMM compliant business model is a top-down modeling activity. The *UMM User Guide*
310 takes this approach.

311 It starts off with a clear understanding of the specific domain of business activities within which
312 the entire model exists. It de-emphasizes the use of business documents and transactions to
313 model this view as that approach may have captured only one part of the required model. An
314 emphasis is placed on the definition of Business Entities, their state management, and state
315 lifecycle identification to produce a model that encompasses all instances and can evolve as new
316 business requirements emerge.

317 Bottom-up modeling can be used as a starting point to fill in parts of the worksheets through use
318 of existing business documents and transactions. It can help identify some model elements.
319 However, the top-down approach must ultimately be applied in order to produce evolvable and
320 maintainable models that support reuse and manage loosely coupled business processes
321 between trading partners on the Internet.

322

323 **Business Information Dependencies, not Document Exchange**

324 The goal of the UMM is to understand and formalize the dependencies between partner
325 processes for a problem domain. Historically business partner communication methodologies
326 (such as EDI) have focused on modeling the business documents being exchanged while the

327 UMM instead focuses on modeling the business actions and objects that create and consume
328 business information.

329 **Measurability / Traceability**

330 The UMM top-down approach drives out the identification of measurable business objectives and
331 requirements, which can be verified by stakeholders. The UMM and the production rules in the
332 *UMM Reference Guide* ensure the reification of these objectives as they are elaborated down to
333 their technical realization. Traceability of these objectives is the basis for ultimate ‘success’ or
334 ‘failure’ of the business model when in operation.

335 The other benefit from the top-down modeling activity is that it expresses the common semantics
336 that will be used to describe a public business collaborative process. Previously defined business
337 processes registered in the *UMM Business Component Libraries* (Registries) will provide
338 definitions of business entities and other elements in business collaboration models. These
339 definitions can be used to validate and categorize the semantics used in the model under
340 construction. A common vocabulary will emerge which will increase the re-use and integration of
341 the components stored in the *UMM Business Component Libraries*.

342 This top-down approach also emphasizes re-usability as the UMM artifacts. This approach
343 emphasizes use of the UMM Business Component Libraries (Registries) to reuse previously
344 defined components.

345 The libraries contain components captured in modeling public, versus private (or enterprise),
346 collaborative business processes and adhere to the UMM and the production rules outlined in the
347 *UML Reference Guide*. Components will be categorized and labeled with appropriate metadata to
348 support ease of search and location of reusable components. New components must follow the
349 procedures outlined by the UN/CEFACT for inclusion in this Library.

350 **Model Production Approach**

351 The UMM has adopted the usage of worksheets as a simple tool to collect and organize the
352 information needed to produce the minimum UMM models for each work area. UMM models can
353 be generated through a variety of methods. The worksheets can be used to manually generate
354 these UMM models. A UML modeler or a Business Process Editor (BPE) tool can be used to
355 generate these in a more indirect and automated fashion. The process of gathering information
356 for the various work areas is iterative. As one works through the various views new information
357 will be discovered and previous worksheets may need to be updated to reflect any changes.

358

359 In gathering the information from business stakeholders to be entered on the worksheets for the
360 BDV, BRV or BTV work areas, the facilitator may learn information that is required for worksheets
361 that would be covered at a later time. Vital information should be captured at the time it is
362 discovered so as not to be lost. Worksheet facilitators should be prepared to keep track of such
363 information on a notepad, for later transfer to the appropriate worksheets. An example of key
364 modeling information that could be discovered in any work area is the identity of business entities
365 and associated parameters such as lifecycles and states. For example, business entity
366 information discovered in the BDV work area would be noted and entered at a later time in the
367 Business Entity and Business Entity Lifecycle worksheets in the BRV work area.

368

369 **3.2 Administrative Worksheet**

370 A generic Administrative Worksheet applies to all work areas, i.e., BDV, BRV and BTV, as a
371 means of capturing information about the source of a model and contact information.

372

Worksheet: Business Model Administration Information	
Model name	[Provide a representative name for the total model.]

Analysts/Modelers	[Provide a list of names of people who are participating in the business process analysis effort. Specify email addresses between angle brackets such as for John Doe <john@company.com>]
Model Owner	[Name of the organization sponsoring the analysis activities or that will own the resultant model. For example, UN/CEFACT.]
Identifier Information	
Agency Id	[The identifier of the organization that owns the business process model (or some subset there of). This is used in conjunction with the Agency field. This information is case sensitive; lower case is recommended. Examples are EAN identifiers and internet domain names.]
Agency	[The name of the agency, which owns or controls the Agency Id values. This information is used to create the BPINs identifiers. This information is case sensitive; lower case is recommended. For example, icann (for ICANN internet domain names) or eann (for EAN identifiers).]

373

374

375 4.0 BDV Work Area

376 4.1 Describe purpose of the BDV work area

377 The BDV is a framework for understanding business area sub-process interrelationships.

378 Often times a Business Domain Model is useful to define an overall “frame of reference” for
 379 the business processes being identified. It is advised that you use a predefined Industry
 380 Reference Model to help:

381 Consistently define the business process area boundaries

382 Achieve business process interoperability with future trading partners also following the
 383 same business reference model for their operating practices.

384

385 Also define basic terms accepted by the given industry segment. For example the Supply
 386 Chain Operations Reference (SCOR) model defines a frame of reference for supply
 387 chain. The Telemanagement Forum (TMForum) enhances the Telecom Operations Map.
 388 There also might be a more horizontal view such as the Porter Value Chain (PVC).

389

390 The BDV work area worksheets help the user begin to formalize the domain they are trying to
 391 model. The first stage is to identify the “top level parts” (entities) of the business domain and
 392 generally organize the main concepts in the domain. One defines the business terminology and
 393 identifies the business participants as well as which business processes those partici-
 394 pants/players interact with. At this stage, i.e., BDV, the goal of the UMM is to:

395 Understand the structure and dynamics of the business domain,
396 Ensure that all users, standards developers and software providers have a common
397 understanding of the business domain,
398 Capture the BDV justification,
399 Identify the stakeholders concerned with the modeled domain, some who will be independent
400 of the processes within the domain.
401 Understand the daily business in the business domain independent of any technical solution,
402 Create categories to help partition the business domain that enables an iteration plan to
403 complete the model,
404 A business environment may be large and complex; understanding of this environment starts
405 from information and documentation provided by business experts. Business experts provide a
406 categorization and decomposition of the business environment into business areas, process
407 areas, and business processes. Later on, in the BRV workflow, business processes are further
408 decomposed into business process activities in order to understand how the stakeholders in this
409 business environment view the discreet units of work done within their organization. Business
410 process activities are either one-partner activities or multi-partner activities.
411 Business process activities that are multi-partner activities are by definition business collaboration
412 activities. Business process activities that are collaborative extend outside the organization.
413 Business collaboration activities define the scope for business requirements gathering and
414 specification. Since the business environment includes identification of requirements placed by
415 one-partner activities on multi-partner activities, the interaction of one-partner activities with multi-
416 partner activities needs to be taken into account as well. All of this takes place in the language of
417 the business environment experts and stakeholders.
418 The UN/CEFACT standard Business Domain Model is the BPAWG International Supply Chain
419 Model.
420 According to the UMM the following guidelines are to be used in defining (the boundaries of) a
421 business area.
422 The stakeholders that have direct or immediate indirect influence on the business domain can
423 define the business area. A stakeholder is defined as someone or something that is materially
424 affected by the outcome of the system but may or may not be an actor. Actors are stakeholders
425 that are involved in the business process and are thus part of the business model.
426 The business area can be defined by the information passing into or out of the business domain.
427 Where possible, the domain boundaries should be chosen so that a business process is logically
428 or organizationally initiated and concluded within them.
429 Key business entity classes can help define the business area. (i.e., things that are accessed,
430 inspected, manipulated, processed, exchanged, and so on, in the business process).
431 Business processes identified in the BDV are either business processes within an enter-
432 prise, i.e., enterprise business processes (that are candidates for B2B collaboration),
433 or collaborative business processes, depending on the starting point for the BDV
434 workflow and the business domain experts on hand to work with the business analyst
435 in developing the BDV.
436 A collaborative business process may derive its requirements from two or more enter-
437 prise business processes (from each participating trading partner).
438 The level of definition is driven by the value to the trading partners, so that they under-
439 stand the business requirements and objectives, and how each business process fits
440 into a larger value chain.
441
442

443
444

4.2 Define BDV work area steps and worksheet(s)

Steps	Artifacts	
	Section / Worksheet Name	Diagrams
1. Identify and Describe Business Area	4.2.1 / Describe Business Domain Model 4.2.2 / Describe Business Area	
2. Identify and Describe Process Area(s)	4.2.3 / Describe Process Area(s)	Business Area/Process Area Package Diagram
3. Identify Business Process(es)	4.2.4 / Identify Business Process(es)	Package diagram identifying and categorizing Business Processes within Business and Process Areas currently available in a Library(Repository)
4. Identify Business Processes from the Business Process Library		BDV Use Case Diagrams for Library supported Business Processes
5. Identify and Finalize Business Processes and Partners		Final BDV Use Case Diagram Using Processes from Library (Processes and Partners Identified)

445

Table 1 - Business Domain View (BDV) Work Area

446

447

4.2.1 Identify and Describe Business Area

448

449

A Business Domain Model is a common business process framework, typically provided by an industry as a result of an effort to describe processes and their points of interconnection that make up the end-to-end customer operations process flows. The enhanced Telecom Operations Map™ (eTOM) of the TeleManagement Forum represents an excellent example of such a framework that focuses on processes that are specific to information and communications services and technologies management. A Business Domain Model for a business environment is the optimum starting point for finding candidate business processes that require or provide an opportunity for B2B collaboration .

457

Form: Describe Business Domain Model	
Business Domain Model Name	[Provide a name for the reference model. You can use an existing reference model such as the Supply Chain Council or the Porter's Value Chain or create your own name.]

™ TeleManagement Forum

Description	[A brief summary of this domain.]
Industry	[Provide the name of the industry that this business applies to. Search the business process library for a list of possible industrys. If the industry does not exist, then provide an appropriate name/label for the industry.]
Business Areas	[List the business areas within the scope. A business area is a collection of process areas. A process area is a collection of business processes. You may wish to refer to the ebXML Catalog of Business Processes that provides a list of normative categories that may be used as business areas.]
Business Justification	[Provide the business justification for the collection of business processes]
Category Schema	[Provide the name of the categorization schema used to categorize business processes in the industry.]
Stakeholders	[Identify the practitioners that care about the definition of this business domain. At this level, this is likely to be some participants in an industry group (perhaps a standards body or an enterprise). These are the people who will define the BRV.]
References	[Any external supporting documentation.]

458

459

460

461

4.2.2 Describe Business Area

462

The first level of decomposition of a Business Domain Model is a Business Area, e.g., market segments of an enterprise or major operational areas such as Assurance processes within Customer Relationship Management in the eTOM. (A business area might consist of sub-business areas). Annex B shows example Business Areas as manufacturing, financial, retail, transportation and services. However, the Business Area categories of a Business Domain Model should reflect the business at hand, e.g., structure of the enterprise or common business process framework of the industry.

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469

Form: Describe Business Area

Business Area Name	[Provide a name for the business area. This should be listed in the Business Areas section of the Business Domain Model.]
Description	[A brief summary of this functional area.]
Scope	[Provide a high level statement that encapsulates the scope of this business area.]
Process Areas	[List the process areas within the scope. A process area is a collection of business processes.]
Objective	[Describe the objective of this business area.]
Business Opportunity	[Describe the business opportunity addressed by this business area.]
Category	[Provide the category identifier used to reference a business area set of business processes. This should be within the category schema.]
Business Areas	[List any other business areas that may be within the scope this business area.]

470

471

472 **4.2.3 Describe Process Area**

473 A Process Area may be another first level decomposition of a Business Domain Model, in a
474 manner that is orthogonal to the categories chosen for the Business Areas. For example, when
475 market segments are chosen for Business Areas, Process Areas may be end-to-end processes
476 within the Business Domain for each Business Area, i.e., five fundamental activities of a business
477 transaction as presented in ISO/IEC 15944-1: planning, identification, negotiation, actualization
478 and post-actualization. Annex B shows example Process Areas as marketing, ordering,
479 distribution, settlement and regulatory. Alternatively a Process Area may be a second level
480 decomposition of a Business Domain Model, e.g., Problem Handling within the Customer
481 Relationship Management – Assurance cell of the eTOM. (A process area might consist of sub-
482 process areas).

483

Form: Describe Process Area	
Process Area Name	[Provide a name for the process area. This should be listed in the Process Areas section of at least one Business Area.]

Description	[A brief summary of this functional area.]
Objective	[Describe the objective of this process area.]
Scope	[Provide a high level statement that encapsulates the scope of this process area. The scope of this process area must be within the scope of the encompassing business area. Typically the scope of the process area will be more constrained or limited than the scope of the corresponding business area.]
Business Opportunity	[Describe the business opportunity addressed by this process area.]
Category	[Provide the category identifier used to reference a business area or process area set of business processes.]
Business Processes	[List the business processes within the scope of this process area.]
Process Areas	[List any other process areas that may be within the scope this process area.]

484

485

486 **4.2.4 Identify Business Process**

487 Identification of Business Processes that require B2B collaboration, or are candidates for B2B
 488 collaborations is a primary objective of the BDV. A Business Process description is specified for
 489 each Business Process identified by this worksheet, using the Business Process worksheet of the
 490 BRV. Thus this worksheet provides a link to the Business Process worksheet. High level
 491 requirements, such as interdependencies with other Business Processes are noted here.
 492 Detailed requirements are left to the Business Process worksheet in the BRV.

493

494

Form: Identify Business Process	
Business Process Name	[Name of the business process as identified in the above Process Area.]
Description	[A plain text explanation of the purpose and behavior of the

	Business Process]
Business Processes	[List any business processes that depend upon, are associated with, or contained within this business process.]
Business Requirements	[High level requirements, such as interdependencies with other Business Processes are noted here.]

495

496

497

498 **5.0 BRV Work Area**

499

500 **5.1 Describe purpose of the BRV work area**

501 The BRV is important to show how a business collaboration type of business process fits into the
502 enterprise views of the participating trading partners

503 Business requirements are expressed with reference to business entities that are affected by a
504 business collaboration activity, e.g., order, goods transfer. Preconditions and post-conditions of
505 the atomic business processes and of the business collaboration itself are best expressed by
506 states of affected business entities, e.g., for order line - pending and order line - fulfilled. In
507 support of this, business entities must be understood as to the states in which they may exist and
508 the permitted state transitions in one or more life cycles. Business requirements are also
509 expressed in terms of events that trigger the state transitions of business entities and of the
510 business collaboration, e.g., delivery of goods triggers the transition of order line status from
511 pending to fulfilled.

512 A business collaboration activity is a predefined set of activities and/or processes of partners that
513 is initiated by a partner to accomplish an explicitly shared business goal and terminated upon
514 recognition of one of the agreed conclusions by all the involved partners. Business information is
515 gathered for the purpose of specifying business collaboration activities in terms of goals,
516 requirements, and constraints. These are then expressed in formal representations that can be
517 understood and confirmed by the business environment experts. Business collaboration activities
518 are specified by a business analyst as business processes, requirements and business object
519 flow graphs that define the choreography of atomic business processes, referred to as Business
520 Transactions. The selection of a business collaboration pattern that fits the requirements of a
521 business collaboration activity, if one is available, optimizes business process and information
522 model reusability. However, in the absence of a suitable business collaboration pattern, the
523 selection of pre-specified Business Transaction patterns simplifies and prescribes reusable
524 components in a business collaboration activity.

525 Business requirements are expressed with reference to business objects that are affected by a
526 business collaboration activity, e.g., order, goods transfer. Preconditions and post-conditions of
527 the atomic business processes and of the business collaboration itself are best expressed by
528 states of affected business objects, e.g., order line - pending and order line - fulfilled. In support
529 of this, business objects must be understood as to the states in which they may exist and the
530 permitted state transitions in one or more life cycles. Business requirements are also expressed
531 in terms of events that trigger the state transitions of business objects and of the business

532 collaboration, e.g., delivery of goods triggers the transition of order line status from pending to
533 fulfilled.

534

535 5.2 Define BRV work area steps and worksheet(s)

536

Steps	Artifacts	
	Section / Worksheet Name	Diagrams
1. Describe REA Elements and Activities of the Business Process Phases	5.2.1 / REA Worksheet	
2. Describe each Business Process (from BDV) in more detail	5.2.2 / Business Process	BRV Use Case Diagram with all identified business processes and partners
3. Identify and describe Business Collaborations starting with a large collaboration and breaking it down to smaller business collaborations use cases which need to be further described until business transactions are identified and described	5.2.3 / Business Collaboration Specification 5.2.4 / Business Process Metric	
4. Define Business Collaborations	5.2.5 / Business Collaboration 5.2.6 / Business Process/ Collaboration Lifecycle (Activity Model)	Business Process Activity Model Conceptual Business Information Model Business Process Use Case Business Collaboration Use Case
5. Identify and Describe Business Entities	5.2.7 / Business Entity 5.2.8 / Business Entity Lifecycle	

537

Table 2 - Business Requirements View (BRV) Work Area

538

539

540 5.2.1 Business Collaboration with REA

541

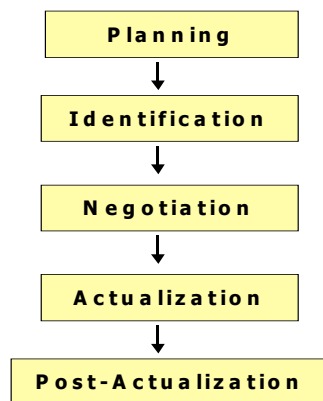
542 An ontology for a business collaboration or for a business process would list the types of ‘things’
543 or objects that one would expect to see in a normal occurrence of a collaboration. The
544 collaboration ontology used for UMM is called REA¹, and is explained in simple overview terms in
545 Appendix A. Readers unfamiliar with REA terms may want to review this section.

¹ REA stands for Resource-Event-Agent, as explained in Appendix A.

546 Most straightforwardly, this ontology gives an analyst a candidate set of top-down objects, in the
 547 form of a UML class diagram, to consider for use in the Business Requirements View phase of
 548 the UMM. The worksheet associated with REA analysis assumes that the collaboration being
 549 studied progresses through five phases from start to finish. These phases are illustrated in
 550 Figure 4 and explained below as they are adapted from the ISO Open-edi model.

551

552 5.2.1.1 ISO Phases of a Business Process²



553

554

Figure 4 Phases of a Business Collaboration from the ISO Open-edi Model

555

556

557 Planning: In the Planning Phase, both the buyer and seller are engaged in activities to
 558 decide what action to take for acquiring or selling a good, service, and/or right.

559 Identification: The Identification Phase pertains to all those actions or events whereby
 560 data is interchanged among potential buyers and sellers in order to establish a one-to-
 561 one linkage.

562 Negotiation: The Negotiation Phase pertains to all those actions and events involving the
 563 exchange of information following the Identification Phase where a potential buyer and
 564 seller have (1) identified the nature of good(s) and/or service(s) to be provided; and, (2)
 565 identified each other at a level of certainty. The process of negotiation is directed at
 566 achieving an explicit, mutually understood, and agreed upon goal of a business collabo-
 567 ration and associated terms and conditions. This may include such things as the detailed
 568 specification of the good, service, and/or right, quantity, pricing, after sales servicing,
 569 delivery requirements, financing, use of agents and/or third parties, etc.

570 Actualization: The Actualization Phase pertains to all activities or events necessary for
 571 the execution of the results of the negotiation for an actual business transaction. Nor-
 572 mally the seller produces or assembles the goods, starts providing the services, prepares
 573 and completes the delivery of good, service, and/or right, etc., to the buyer as agreed
 574 according to the terms and conditions agreed upon at the termination of the Negotiation
 575 Phase. Likewise, the buyer begins the transfer of acceptable equivalent value, usually in
 576 money, to the seller providing the good, service, and/or right.

577 Post-Actualization: The Post-Actualization Phase includes all of the activities or events
 578 and associated exchanges of information that occur between the buyer and the seller
 579 after the agreed upon good, service, and/or right is deemed to have been delivered.
 580 These can be activities pertaining to warranty coverage, service after sales, post-sales

581 financing such as monthly payments or other financial arrangements, consumer com-
 582 plaint handling and redress or some general post-actualization relationships between
 583 buyer and seller.

584

585

586 5.2.1.2 The REA Worksheet

587 The REA worksheet that follows is patterned on the ISO description phases enumerated above.
 588 For parsimony, the elements of the planning and identification phase have been combined, as
 589 have the elements of the actualization and the post actualization phase. The analysis and
 590 requirements dialogue elicited from filling this worksheet out will clarify much of the work to be
 591 done in the remainder of the BRV (such as the Business Collaboration Worksheets and the
 592 Business Entity Worksheets). Users are expected to find themselves going back and reiterating
 593 through all of the worksheets as their requirements analysis becomes clearer and more amplified.

594 The **Overall Business Process REA Elements** part of the worksheet includes a description of
 595 the following:

- 596 ○ **Business Process Name** -- Name the overall business process being modeled from the
 597 BDV analysis above. For example: Order From Catalog or Service Acquisition.
- 598 ○ **Resources** -- Identify in general terms the required resource flows for this collaboration
 599 or business process. For example: Products for Cash, or Services for Credit Card
 600 Charge.
- 601 ○ **Partners** -- Identify the proposed business partners for this business process. For
 602 example: Seller, Buyer, and Shipper.

603 The **ISO Business Process Phases** row headings divide the remainder of the worksheet into
 604 three columns: **Planning/Identification**, **Negotiation**, and **Actualization/Post-Actualization**.

605 The **Activities Performed** row asks for a preliminary list of the tasks needed to complete each of
 606 the ISO process phases. Eventually these may prove to be candidate Business Processes.

- 607 ○ **Planning/Identification** -- Identify the activities involved in preliminary planning and the
 608 subsequent 1-to-1 matching of the reciprocal business partners. For example:
 - 609 ○ Request catalog or product list
 - 610 ○ Send catalog
 - 611 ○ Send availability request
- 612 ○ **Negotiation** -- Identify the activities involved in the normal negotiation and contracting
 613 process among the trading partners. For example:
 - 614 ○ Send offer
 - 615 ○ Send counter-offer
 - 616 ○ Buyer sends contract acceptance
- 617 ○ **Actualization/Post-Actualization** -- Identify the activities involved in the required
 618 transfers of economic resources between the identified trading partners. For example:
 - 619 ○ Send an shipping notice
 - 620 ○ Send receiving report
 - 621 ○ Send invoice
 - 622 ○ Send remittance advice
 - 623 ○ Send warranty invocation (post-actualization activity).

624

625 The Business Entities section of the REA worksheet identifies Business Entity candidates and
626 shows how the identification of these entities flows through the ISO process phases.

627 ○ **Collaborative Business Partners:**

628 ○ In the **Planning/Identification** phase -- Provide a name for the parties who are
629 potential business partners in this proposed business process. These candidates
630 should be identifiable as potential buyers (consumer) or sellers (producer) of re-
631 sources identified in the cell just below this one in the worksheet.

632 ○ In the **Negotiation** phase -- Provide additional party names if negotiations and
633 contracting expand scope of collaboration. For example, the proposed use of a
634 drop-shipper or monetary agent.

635 ○ In the **Actualization/Post-Actualization** phase – Provide additional party names
636 if the actualization activities involve expanding the list of partners. For example,
637 if an agent for the buyer or seller might be used on a non-planned (not in the con-
638 tract) basis.

639 ○ **Types of Identified Resources:**

640 ○ In the **Planning/Identification** phase -- Provide a name for the types of eco-
641 nomic resources to be exchanged in the business process. One of these will al-
642 most certainly be monetary in nature. Examples might be materials for cash, digi-
643 tal resources for cash, financial services for credit card charge, etc.

644 ○ In the **Negotiation** phase -- Provide additional information if negotiation and con-
645 tracting leads to more specific identification of resource types. For example, ma-
646 terials may be further classified into product groups.

647 ○ **Types of Events, Locations, or Partners To Be Specified** (Negotiation phase only) -- If the
648 proposed exchange of resources from one partner to another has specialized constraints on
649 the types of events or on the types of location or on the types of partner (often expressed as
650 roles or specialized skills) needed to fulfill contracted commitments in the exchange, then list
651 them here. For example:

652 ○ **Event Types:** retail vs. wholesale types of purchases or hazardous vs. non-
653 hazardous shipments.

654 ○ **Location Types:** an approved receiving facility or a warehouse dock of a certain
655 width and strength.

656 ○ **Partner Types:** approved buyers, bonded cashiers, or appropriately designated
657 customs authorities.

658 ○ **Specific Commitments** (Negotiation phase only) – Negotiations for resource exchanges
659 normally result in the trading partners making specific commitments to each other to per-
660 form in the future. These commitments identify the terms of trade to be adhered to in the
661 form of specifications for the resource types, event types, location types, and partner
662 types enumerated in the cells above this row in the worksheet. A common example of a
663 commitment is an order-line item. Commitments should occur in reciprocal pairs. For
664 example, a commitment to deliver 100 cookies of type chocolate at wholesale pricing to
665 any approved local store is reciprocated by a commitment to pay from a credit account
666 two days later.

667 ○ **Specific Contract or Agreement** (Negotiation phase only) – A contract bundles
668 reciprocal commitments. For example, a shipment schedule or a purchase order could a
669 aggregate a commitment to ship with a commitment to pay. It is also possible here to
670 specify an **Agreement Type** if the agreement is an example of a generalized type like a
671 short-term purchase order or a year-long agreement with periodic releases.

- 672 ○ **Exchanged Resources** (Actualization phase only) – Identify the actual transferred
673 economic resources in the exchange. For example, a specific car or a specific piece of
674 furniture. In many cases, the actualization tagging of resources stops at the type-level of
675 granularity, in which case the business entity here – **Resource** – will be congruent with
676 the **Resource Type** business entity recognized in the negotiation phase above. This
677 makes one of the two business entities redundant, so they should be combined.
- 678 ○ **Exchange Events** (Actualization phase only) -- Identify the names of actual economic
679 events whose completion effects transfer of the identified economic resources from one
680 partner to the other. For example, a completed shipment transfers products, and it is
681 compensated by a later cash payment.
- 682 ○ **Actual Location** (Actualization phase, although it may apply to negotiation phase on
683 occasion) – If it is important to note where an economic event occurred, location be-
684 comes a candidate business entity. On less frequent occasions, it is sometimes neces-
685 sary to specify locations for commitments as they are negotiated in that phase.
- 686 ○ **Materialized Claim** (Actualization phase) -- If the contract or normal business practice
687 entails specific identification of a partially fulfilled commitment with a materialized claim,
688 identify that claim as a candidate business entity. For example, an invoice or a receiv-
689 able.

690 The **Possible Exception Conditions** row of the worksheets allows enumeration of exception
691 conditions that could interrupt the normal process flow from collaboration start to collabora-
692 tion finish through the ISO phases. For example:

- 693 ○ In **Planning/Identification**, an exception can occur when an identified business partner
694 is unable to respond to an availability request. This causes a need for re-identification.
- 695 ○ In **Negotiation**, an exception can occur in complete rejection of proposals. This causes
696 suspension or abandonment of the proposed collaboration.
- 697 ○ In **Actualization**, an exception can occur when a shipped product proves faulty. This
698 causes a need for warranty invocation.

699 The **Phase Completion Criteria** row of the worksheets specifies the state conditions for
700 completeness of the appropriate ISO business process phase. For example, here are some
701 state conditions that may apply in most cases.

- 702 ○ The **Identification** phase may be signaled as complete when the **Partners** are all in
703 state “identified” and the **Resource Types** are also all in state “identified.”
- 704 ○ The **Negotiation** phase may be signaled as complete when the **Contract** and its bundled
705 **Commitments** are all in state “in-force.” This requires as a precondition that the **Re-**
706 **source Types** (and possibly **Event Type**, **Location Type**, and **Partner Type** as well) be
707 in state “specified.”
- 708 ○ The **Actualization** phase may be signaled as complete when the **Economic Events** are
709 in state “complete,” the **Economic Resources** are in state “transferred,” the **Economic**
710 **Claim** is in state “settled,” and the **Commitments** are in state “fulfilled.”

711

712 When the REA worksheet has been completed, a UMM user analyst may consolidate his or her
713 analysis by preparing a preliminary UML class diagram that illustrates how the identified set of
714 candidate business entities fit together. Again, guidance in preparing that diagram can be
715 obtained with a quick scan of the text in the REA overview of Appendix A.

716

717

Form: REA Worksheet			
Overall Business Process REA Elements	Business Process Name		
	Resources		
	Proposed Business Partners		
ISO Business Phases	Planning/Identification	Negotiation	Actualization/ Post-Actualization
Activities Performed			
Business Entities (candidates)			
Collaborative Business Partners			
Types of Identified Resources			
Types of Events, Locations, or Partners To Be Specified			
Specific Commitments (two min.)			
Specific Contract or Agreement			
Exchanged Resources (two min.)			
Exchanged Events (two min.)			
Actual Location (if needed)			
Materialized Claim (if needed)			
Possible			

Exception Conditions			
Phase Completion Criteria (expressed as entity states if possible)			

718

719

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721

722 **5.2.2 Business Process**

723

724 The business process worksheet is the primary vehicle for gathering detailed requirements.

725 Business requirements are specified as single concept sentences in five categories:

726 1) Describe static relationships that must exist between entities, e.g., a Buyer must have a credit
727 rating,

728 2) Describe normal dynamic relationships that must exist between activities, e.g., the company
729 has the option of doing a credit check on any query made from any Buyer before responding
730 to a query, Note that the Process Lifecycle worksheet captures dynamic requirements of a
731 business process or business collaboration, and would suffice for this category.

732 3) Describe “exception” conditions, e.g., any time that a Buyer’s credit rating changes, their
733 product reservations may be deleted,

734 4) System exceptions, e.g., a specific customer account number does not exist,

735 5) System administration requirements, e.g., security staff should be able to add/delete partner
736 and Buyer names while the system is “up.”

737 A business process lifecycle is a set of conditions that can be identified for the business process,
738 i.e., Begins When, Ends When, intermediate points that can be monitored, and points where
739 exception processing could begin that result in an outcome other than normal completion. The
740 Lifecycle entry on this worksheet is a link to the Process Lifecycle worksheet where detailed
741 information would be specified.

742

Form: Business Process	
Business Process Name	[Provide a name for the business process. This should be a name identified on the form “Identify Business Process” and on a “Describe Process Area” form.]
Description	[A plain text explanation of the purpose and behavior of the Business Process]
Business Requirements	[The list of business requirements that apply to this business]

	process. The format of requirement definition is covered (as shown in Annex 4, Business process Specification Template, in the UMM).]
Definition	[A set of simple sentences that state actions may be performed as part of the business process.]
Participants	[List the type of partners involved in the business process. E.g. manufacturer, supplier, customer]
Preconditions	[Preconditions are the rules defining the conditions that must be true for the context that this process is conducted within. These rules are constraints that must be satisfied before instantiating or initializing the business process thus ensuring that the proper context for the process has been established.]
Begins When	[Identifies the event(s) from that start this business process.]
Ends When	[[List all the event(s) that causes normal completion of the business process.]
Exceptions	[List all exception conditions (events) that will cause the business process to terminate before its normal completion.]
Post-conditions	[Post-conditions are the rules defining the conditions that must be true for the localized context that exists after the business process completes. These rules are constraints that must be satisfied after the business process thus ensuring that the proper update to context of the parent process has been occurred.]
Supporting Business Collaborations and/or Business Processes	[List the business collaborations and business processes that support (are part of) this business process.]
Lifecycle(s)	[Identify the Lifecycle(s) (Activity Model) that formalizes the definition of this Business Process.]

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744
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746

747 **5.2.3 Business Collaboration Specification**

748 Specify a business collaboration use case description with this worksheet when there are two or
 749 more actors. The Business Collaboration Specification worksheet is an extension of the Business
 750 Process Worksheet, thus many aspects of the description of the Business Process worksheet in
 751 5.2.1 pertain to this worksheet as well. As for the Business Collaboration Specification Type,
 752 whenever there are two or more actors, a business process is a candidate for one of two types of
 753 business collaborations. A business collaboration protocol is a business collaboration at a low
 754 enough level that it can be represented by an activity graph, comprised of business transactions,
 755 each with object states specified as preconditions and post-conditions. Business transactions are
 756 the atomic level business collaborations according to the six BTV patterns. The same Business
 757 Collaboration Specification worksheet is used for these two types of business collaborations.

758 Realization is a link to the Business Collaboration worksheet (where additional detail would be
 759 specified) that corresponds to the Business Collaboration Specification worksheet. Supporting
 760 business collaborations are links to other instances of this worksheet for business collaboration
 761 protocols, or business transactions. Metrics is a link to the business process metric worksheet,
 762 which requests detailed information. Business transaction service functions that are prescribed
 763 as part of the BSV are identified here as trigger events for a business transaction.

764

765

Form: Business Collaboration Specification	
Business Collaboration Specification Name	[Provide a name for the Business Collaboration]
Business Collaboration Specification Type	[Choice between Business Collaboration Protocol or Business Transaction Specification .]
Description	[A plain text explanation of the purpose and behavior of the Business Collaboration Specification]
Definition	[A set of simple sentences that state the actions performed as part of the business process.]
Participants	[List the type of partners involved in the Business Collaboration, e.g. manufacturer, supplier, customer.]
Preconditions	[Preconditions are the rules for defining the conditions that must be true for the context that this process is conducted within. These rules are constraints that must be satisfied before instantiating or initializing the Business Collaboration thus ensuring that the proper context for the process has been established.]
Begins When	[Identifies the event(s) from that start this Business Collaboration.]

Ends When	[List all the event(s) that causes normal completion of the Business Collaboration.]
Exceptions	[List all exception conditions (events) that will cause the Business Collaboration to terminate before its normal completion.]
Post-conditions	[Post-conditions are the rules for defining the conditions that must be true for the localized context that exists after the Business Collaboration completes. These rules are constraints that must be satisfied after the business process thus ensuring that the proper update to context of the parent process has been occurred.]
Realization	What Business Collaboration is use to realize or instantiate this Business Collaboration Specification
Business Requirements	[The list of business requirements that apply to this Business Collaboration. The format of requirement definition is covered (as shown in Annex 4, Business process Specification Template, in the UMM).]
Supporting Business Collaborations (including Business Transactions and Collaboration Protocols)	[List the business transactions and business collaboration protocols that support (are part of) this business collaboration.]
Lifecycle(s)	Identification of the Lifecycle(s) (Activity Model) that formalizes this Business Collaboration.
Metrics	[List of Metrics to be recorded for this business process/collaboration]
	Initiating:
	Responding:

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5.2.4 Business Process Metric

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Business process metrics are operational or structural measurements that track how a business process is performing over time. Operational metrics deal directly with dynamic properties of business while structural metrics deal with static properties. For example, quantity measurements are a performance count or a measure of the amount of product produced by a single process case performance. Quality measurements are a determination of the value of the particular product in relation to some pre-determined quality norm. Time of performance is a measure of

776 elapsed time between inception based on preconditions and completion based on post-conditions
 777 being in place.
 778

Form: Business Process Metric	
Business Process Metric	[Provide a name for identification of a Metric or KPI. Metrics are the rules for defining the conditions for evaluating the localized context that exists during the Business Collaboration execution. They may define Key Performance Indicators (KPI) that reflect the achievement of particular business goals and/or objectives. These KPI's may also be the trigger certain events that are used as input to this and other processes.]
Description	[A plain text explanation of the purpose and behavior of the Business Process Metric]
Metric	[Provide the business rule that defines this metric. These rules must be computational in format, e.g. OCL or other formal notation.]
Start Trigger	[<u>Identifies the event that start the measurement of the metric.</u> <u>This event may be computational in format, e.g. OCL or other formal notation.</u>]
End Trigger	[<u>Identifies the event that stops the measurement of the metric.</u> <u>This event may be computational in format. E.g.: OCL or other formal notation.</u>]

779
 780

781

782 **5.2.5 Business Collaboration**

783 A business collaboration is the realization or instantiation of a business collaboration
 784 specification. Thus, an instance of this worksheet is linked to an instance of the Business
 785 Collaboration Specification worksheet. Realization of a business collaboration specification is
 786 accomplished by introducing roles, resources, relationships of roles and resources to activities,
 787 and defining the associations. (This would be done by applying a business collaboration or
 788 business transaction pattern.) New information (over and above that in the Business
 789 Collaboration Specification worksheet) is requested for partner roles and business entities
 790 associated with the business collaboration.

791

792

Form: Business Collaboration							
Business Collaboration Name	[Provide a name for the Business Collaboration. Normally this should be the same as the BCS that it instantiates, however due to possible contextual constraints or business rules it may be necessary to differentiate this collaboration.]						
Business Collaboration Specification	[What Business Collaboration Specification does this Business Collaboration realize/instantiate?]						
Description	[A plain text explanation of the purpose and behavior of the Business Collaboration Specification]						
Participants	[List the type of partners involved in the Business Collaboration. E.g. manufacturer, supplier, customer]						
Preconditions	From BRV Business Collaboration Specification Worksheet						
Begins When	From BRV Business Collaboration Specification Worksheet						
Ends When	From BRV Business Collaboration Specification Worksheet						
Exceptions	From BRV Business Collaboration Specification Worksheet						
Post-conditions	From BRV Business Collaboration Specification Worksheet						
Partner Roles	<p>[Identify the roles played by each partner.]</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #d3d3d3;"> <th style="width: 50%;">Partner</th> <th style="width: 50%;">Roles</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Partner	Roles				
Partner	Roles						
Business Entities	[Identify the Business Entities associated with this collaboration.]						
Supporting Business Transactions or Business Collaborations	[List the business transactions or business collaborations that support (are part of) this business collaboration.]						

793 **5.2.6 Business Process Lifecycle**

794

795

796 This worksheet is used to capture the dynamic requirements, i.e., activity model, for a business
 797 process or business collaboration. Activities indicated here are internal to a business process or
 798 business collaboration.

799

Form: Business Process/Collaboration Lifecycle (Activity Model)	
Process Lifecycle Name	[Provide a name for this Lifecycle. This name is used to identify the lifecycle that a Business Process or Business Collaboration is formally defined by.]
Description	[A plain text explanation of the purpose and behavior of the Lifecycle.]
Preconditions	[Preconditions are the rules for defining the conditions that must be true for the context that this process lifecycle is executed within. These rules are constraints that must be satisfied before instantiating or initializing the process lifecycle thus ensuring that the proper context for the process has been established. These conditions must be a subset of the preconditions defined by the process that this lifecycle is defining and be computational in format. E.g.: OCL or other formal notation.]
Begins When	[Identifies the event(s) that start this process lifecycle. For any lifecycle there is only one starting point, known as a start state. This list of events is the only one which will instantiate the lifecycle and cause it to enter into a start state. These event(s) must be a subset of the event(s) defined by the process that this lifecycle is defining and be computational in format. E.g.: OCL or other formal notation.]
States	The following section defines the states or conditions that the process lifecycle can be in.
Start State	The Start State is a pseudo state in which the initialization and instantiation of lifecycle artifacts and context occurs.]
State Transition Table (Start State)	Event: [Identifies the event(s) that start this process lifecycle. For any lifecycle there is only one starting point, known as a start state. This list of events is the only one which will instantiate the lifecycle

and cause it to enter into a condition or state as determined by the processing of a defined event.]
 These event(s) must be a subset of the event(s) defined by the process that this lifecycle is defining and *may* be computational in format. E.g.: OCL or other formal notation.]

Source: [For each event listed above identify the source of the event as defined by the current lifecycle context].

Rule: [For each event, define the constraint or guard that indicates the resultant condition or state. If there are multiple states for a given event there should be a rule for each. This rule should be computational in format. E.g.: OCL or other formal notation.].

Transition to: [For each event identify the resulting condition (state) of the lifecycle. If a particular event can result in more than one condition or state define the rule that indicates which condition will be the actual resultant.].

Event	Source	Rule	Transition to

For each state or condition of the lifecycle, repeat the following entries.

State

Name: [Identify a state or condition of this lifecycle.]

Description: [Provide a textual description of this condition/state]

Definition: [Definitions are the rules for defining the localized conditions that must be true within the context of this process lifecycle that asserts that this condition has been achieved. If these rules are not true for this condition, then an invalid or unknown state has been achieved.

These rules must be computational in format. E.g.: OCL or other formal notation.]

Actions: [Identify the set of actions that may be performed while in this state. Define the constraint (rule) that controls the performance of each action. In the case where no constraint is defined, the action is always performed.]

Name:

Description:

Definition:

	Actions:			
Transitions	Event	Source	Rule	Transition to
State	Name:			
	Description:			
	Definition:			
	Actions:			
Transitions	Event	Source	Rule	Transition to
Post-conditions	<p>[Post-conditions are the rules for defining the conditions that must be true for the localized context that exists after the process lifecycle completes. These rules are constraints that must be satisfied after the lifecycle thus ensuring that the proper update to context of the parent process has occurred.</p> <p>These constraint(s) must be a subset of the constraint(s) defined by the process that this lifecycle is defining and be computational in format. E.g.: OCL or other formal notation.]</p>			

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804 **5.2.7 Business Entity**

805 The entries in this worksheet are self explanatory.

806

807

Form: Business Entity			
Business Entity Name:	[Provide the name that this Business Entity is identified by.]		
Description:	[A plain text explanation of the purpose and behavior of the Business Entity.]		
Business Entity Characteristics	Define the set of characteristics or attributes that define the structural aspects of the Business Entities.		
	Name	Type	Constraints
Business Entity Behavior	Define the set of operations that affect the behavioral aspects of the Business Entity.		
Name:	[Enter the name of the operation.]		
Lifecycle:	[Enter the name of the lifecycle that defines this behavior.]		

808

809

810 **5.2.8 Business Entity Lifecycle**

811 The entries in this worksheet are self explanatory.

Form: Business Entity Lifecycle	
Business Entity Lifecycle Name	[Name the State Model. Below, in the States section of this worksheet, you can mention all of the state values and their information requirements]
Business Entity Name	[Provide a name for the Business Entity]
Description	[A plain text explanation of the purpose and behavior of the lifecycle defined here.]
States	The following section defines the states or condition that the lifecycle can occur.
Start State	The Start State is a pseudo state in which the initialization and

	instantiation of lifecycle artifacts and context occurs.												
<p>Transitions (Start State)</p>	<p>Event: [Identifies the event(s) from the start state of this lifecycle. For any lifecycle there is only one starting point, known as the start state. This list of events are the only ones that would instantiate the lifecycle and cause the business entity to enter into a condition or state as determined by the processing of the defined event.</p> <p>These event(s) may be computational in format. E.g.: OCL or other formal notation.]</p> <p>Source: [For each event listed above identify the source of the event as defined by the current lifecycle context].</p> <p>Rule: [For each event, define the constraint or guard that indicates the resultant condition or state. If there are multiple states for a given event there should be a rule for each. This rule should be computational in format. E.g.: OCL or other formal notation.].</p> <p>Transition to: [For each event identify the resulting condition (state) of the lifecycle. If a particular event can result in more than one condition or state define the rule that indicates which condition will be the actual resultant.].</p> <table border="1" data-bbox="597 957 1369 1131"> <thead> <tr> <th>Event</th> <th>Source</th> <th>Rule</th> <th>Transition to</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Event	Source	Rule	Transition to								
Event	Source	Rule	Transition to										
For each state or condition of the lifecycle, repeat the following entries.													
<p>State</p>	<p>Name: [Identify a state or condition of this lifecycle.]</p> <p>Description: [Provide a textual description of this condition/state]</p> <p>Definition: [Definitions are the rules for defining the localized conditions that must be true within the context of this lifecycle that assert that this condition has been achieved. If these rules are not true for this condition, then an invalid or unknown state has been achieved.</p> <p>These rules must be computational in format. E.g.: OCL or other formal notation.]</p> <p>Actions: [Identify the set of actions that may be performed while in this state. Defined the constraint that controls the performance of each action. In the case where no constraint is defined, the action is always performed.]</p> <p>Name:</p> <p>Description:</p> <p>Definition:</p> <p>Actions:</p>												

Transitions	<p>[For each event listed above identify the resulting condition (state) of the lifecycle. If a particular event can result in more than one condition or state, define the constraint (rule), that indicates which condition would be the actual resultant. This constraint should <u>be computational in format</u>. E.g.: OCL or other formal notation.].</p> <table border="1"> <thead> <tr> <th>Event</th> <th>Source</th> <th>Rule</th> <th>Transition to</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>				Event	Source	Rule	Transition to								
Event	Source	Rule	Transition to													
State:	<p>Name:</p> <p>Description:</p> <p>Definition:</p> <p>Actions:</p>															
Transitions	<table border="1"> <thead> <tr> <th>Event</th> <th>Source</th> <th>Rule</th> <th>Transition to</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>				Event	Source	Rule	Transition to								
Event	Source	Rule	Transition to													
Post-conditions	<p>[Post-conditions are the rules for defining the conditions that must be true for the localized context that exists after the process lifecycle completes. These rules are constraints that must be satisfied after the lifecycle, thus ensuring that the proper update to context of the parent process has occurred.</p> <p>These constraint(s) must be a subset of the constraint(s) defined by the process that this lifecycle is defining and be computational in format. E.g.: OCL or other formal notation.]</p>															

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6.0 BTV Work Area

815

6.1 Describe purpose of the BTV work area

816

817

818 The Business Transaction View (BTV) is an elaboration on the business requirements view by the
 819 business analyst and is how the business analyst sees the process to be modeled. In the BRV
 820 use case descriptions for the business collaboration and all included business transactions have
 821 been provided. According to these descriptions a choreography of the business transactions
 822 within the business collaboration must be defined. An activity graph, the so-called business
 823 collaboration protocol, choreographs the business transaction activities. Note, no other activities
 824 are allowed in a business collaboration protocol. Furthermore, the business collaboration protocol
 825 defines the transitions between business transaction activities based on business entity states.
 826 Accordingly, the business collaboration protocol defines the overall choreography of the business
 827 collaboration. The business collaboration protocol worksheet helps to define this step.

828 Each activity of the business collaboration protocol is a business transaction activity, which is
829 further detailed by a business transaction which is by itself an activity graph. There is a 1-to-1
830 relationship between business transaction activity and business transaction. Thus, the terms
831 business transaction activity and business transaction are synonyms from a business viewpoint,
832 but refer to different notations in UML.

833 A business transaction is an atomic business process between two business partners, which
834 involves sending business information from one partner to the other and an optional reply. A
835 business transaction is made up of a requesting (initiating) business activity performed by the
836 initiating partner and a responding business activity performed by the responding business
837 partner. The requesting business activity outputs business information (represented by a object
838 flow state) that is input to the responding business activity. Business information created by the
839 responding business activity and returned to the initiating business activity is optional. A business
840 transaction follows one out of six different business transaction patterns. A worksheet supports
841 the definition of the corresponding business transaction.

842 The purpose of a business transaction is triggering a state transition of a business entity
843 according to the business requirements. In a collaborative environment both business partners
844 must align the states of the business entities. Thus, they have to share the views of the business
845 entities by exchanging business information. It follows that the goal of exchanging business
846 information is changing the state of a business entity.

847 What makes up the business information to satisfy this goal? It seems to be straight forward that
848 the business information must reference all the business entities changing state as a result of the
849 exchange. For each of these business entities the minimum information required to change the
850 state must be identified. Note, here is the big difference to traditional EDI which was based on
851 business documents carrying a lot of overhead. Additionally, the business information includes
852 some general information, something like header information that is independent of the business
853 entities.

854 Information about business entities (as well as the general information) is manifested by business
855 objects. A business objects is a reusable class or a set of associated classes representing a
856 specific business concept in order to build business information structures. Reusable means that
857 business objects are not specific to a single business transaction. Therefore, this approach
858 assumes the existence of a library of business objects. When modeling business information
859 structures, one will select suitable business objects from this library and customize them to the
860 needs of the business transaction. Customizing means setting the business objects into the
861 context of the business transaction.

862 Customizing business objects consists of two major tasks. The first task is establishing
863 relationships, mostly associations, between the selected business objects. The context in which a
864 business object is associated to another one is notated by an association role. For example: A
865 party registers its party details including a shipping address and an optional billing address. Two
866 associations between party and address are established, one with the association role "shipping"
867 and one with the association role "billing" on the address end of the association. It follows that the
868 UMM approach of setting business objects in context is based on association roles. Customiza-
869 tion based on generalization (e.g. defining subclasses shipping address and billing address of
870 the superclass address) and enumerated type attributes (e.g. adding an attribute called "type" to
871 the class address that takes on an enumerated value of billing, shipping, etc.) are not used in
872 UMM.

873 The second task during customization focuses on the attributes of business objects. A re-usable
874 business object lists a number of attributes that are meaningful in general. However, not all of
875 these attributes might be valid in a given context. Since the business information exchanged is
876 always modeled in context, the business information presents a view on the business objects.
877 This means, one has to select the attributes that apply in the given context, i.e. that are
878 necessary to change the state of a business entity. Note, if a business object is built by
879 associated classes, the second task does also apply to the associations between these classes.

880 What is the relationship between business objects and core components? Both provide building
 881 blocks that are independent of the transfer syntax. These building blocks are used to structure
 882 information exchanged between business partners. Core components are the result of a bottom-
 883 up approach. This means that they provide building blocks for business documents as they were
 884 used in traditional EDI. Business Objects follow an object-oriented approach and cover business
 885 logic that is used for business entity changes. This means business objects are the object-
 886 oriented representation of core components that follow a top-down approach. It follows that there
 887 will be a lot of business objects and core components that represent the same business concept
 888 and have a considerable overlap in their anatomy. Thus, core components provide an excellent
 889 source in building business objects. Conceptually, business objects refer to core components,
 890 and their customization within a business information refers to a business information entity. This
 891 means, business information entities are not a source for building business objects.

892 Annex C defines all the data types for UMM. The data type of any attribute of a business object
 893 must be one out of this list. Furthermore, the annex shows some very basic business objects.

894

895 The Business Information worksheet is provided for documenting the key informational elements
 896 that are important to a transaction. This worksheet is very helpful in achieving document element
 897 level interoperability (particularly in cases where document schemas are used in different
 898 business transactions). Key elements include, but are not limited to, the following:

899 Information that is necessary or helpful in correlating the exchanged business documents
 900 within the same transaction or across multiple transactions

901 Information that is critical or has proven to be problematic in the past for integration and
 902 interoperability of the services participating in the business transaction

903 Specification of enumerated data types (code lists) and subsets thereof

904 Constraints on the values in the business information exchanged

905

906

907 6.2 Define BTV work area steps and worksheet(s)

908

Steps	Artifacts	
	Section / Worksheet Name	Diagrams
1. Define a Business Collaboration Protocol (object state flow diagram) for each business collaboration use case (built by business transaction activities)	6.2.1 / Business Collaboration Protocol (Activity Model)	Business Collaboration Object Flow Diagram
2. For each Business Transaction activity define a business transaction activity graph. Identify requesting information and optional responding information	6.2.2 / Business Transaction	Use Case Diagram Business Transaction Object Flow Diagram
3. Create class diagrams by re-using existing information structure	6.2.3 / Business Information	Final Business Information Models

909

Table 3 - Business Transaction View (BTV) Work Area

910

911 **6.2.1 Business Collaboration Protocol (Activity Model)**

912 This worksheet is self explanatory.

Form: Business Collaboration Protocol (Activity Model)	
Business Collaboration Protocol	[Provide a name for the Business Collaboration Protocol.]
Description	[A plain text explanation of the purpose and behavior of the Business Collaboration Protocol]
Preconditions	<p>[Preconditions are the rules for defining the conditions that must be true for the context that this BCP is executed within. These rules are constraints that must be satisfied before instantiating or initializing the BCP thus ensuring that the proper context for the BCP has been established.</p> <p>These conditions must be computational in format. E.g.: OCL or other formal notation.]</p>
Begins When	<p>[Identifies the event(s) from that start this BCP. For any BCP there is only one starting point, known as a start state. This list of events are the only ones which will instantiate the BCP and cause it to enter into a condition or state as determined by the processing of the defined event.</p> <p>These event(s) may be computational in format. E.g.: OCL or other formal notation.]</p>
Business Transaction Activities	
Start State	The Start State is a pseudo state in which the initialization and instantiation of Business Collaboration Protocol artifacts and context occurs.].
Recognized Events (Start State)	<p>[Identifies the event(s) from that start this Business Collaboration Protocol. For any Business Collaboration Protocol there is only one starting point, known as a start state. This list of events are the only ones which will instantiate the BCP and cause it to enter into a condition or state as determined by the processing of a defined event.</p> <p>These event(s) may be computational in format. E.g.: OCL or other formal notation.]</p>

<p>Transitions (<u>Start State</u>)</p>	<p>[For each event listed above identify the resulting Business Transaction Activity of the Business Collaboration Protocol. If a particular event can result in more than one Business Transaction Activity, define the constraint, which indicates which condition will be the actual resultant.</p> <p>If more than one constraint qualifies for a particular event, then the Business Collaboration Protocol process path will fork.</p> <p>This constraint should <u>be computational in format. E.g.: OCL or other formal notation.</u>].</p>			
<p>State:</p>				
<p>Transitions</p>	<p>Event</p>	<p>Source</p>	<p>Rule</p>	<p>Transition to</p>
<p>State</p>				
<p>Transitions</p>	<p>Event</p>	<p>Source</p>	<p>Rule</p>	<p>Transition to</p>
<p>For each Business Transaction Activity of the lifecycle, repeat the following entries.</p>				
<p><i>Business Transaction Activity</i></p>	<p>Name: [Identify a Business Transaction Activity of this Business Collaboration Protocol.]</p> <p>Description: [Provide a textual description of this Business Transaction Activity]</p> <p>Definition: [Definitions are the rules for defining the localized conditions that must be true within the context of this Business Collaboration Protocol that asserts that this condition has been achieved. If these rules are not true for this condition, then an invalid or unknown state has been achieved.</p> <p>These rules must be computational in format. E.g.: OCL or other formal notation.]</p> <p>Action: [Identify the Business Transaction that is performed while in this Business Transaction Activity.]</p>			
<p><u>Recognized Events</u></p>	<p>[Identifies the event(s) that are recognized by the Business Transaction Activity.</p> <p>These event(s) may be computational in format. E.g.: OCL or other formal notation.]</p>			

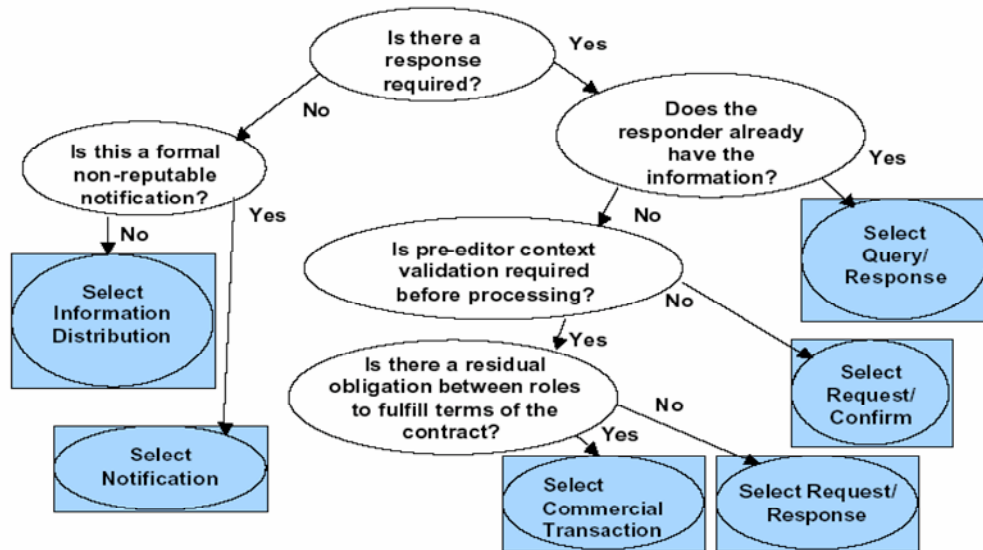
Transitions	Event:	<p>[For each event listed above identify the resulting Business Transaction Activity of the Business Collaboration Protocol. If a particular event can result in more than one Business Transaction Activity, define the constraint, which indicates which condition will be the actual resultant.</p> <p>If more than one constraint qualifies for a particular event, then the Business Collaboration Protocol process path will fork.</p> <p>This constraint should be computational in format. E.g.: OCL or other formal notation.]</p>
	Associated Business Entity:	[Identify any Business Entities that are affected by this transition and their defined state.]
Business Transaction Activity	<p>Name:</p> <p>Description:</p> <p>Definition:</p> <p>Action:</p>	
Recognized Events		
Transitions:	Event:	
	Associated Business Entity:	
Post-conditions	[Post-conditions are the rules for defining the conditions that must be true for the localized context that exists after the Business Collaboration Protocol completes. These rules are constraints that	

	<p>must be satisfied after the Business Collaboration Protocol thus ensuring that the proper update to context of the parent process has occurred.</p> <p>These constraint(s) must be a subset of the constraint(s) defined by the process that this Business Collaboration Protocol is defining and be computational in format. E.g.: OCL or other formal notation.]</p>
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6.2.2 Business Transaction

The follow figure provides simple decision criteria for selection of business transaction patterns.



917
918

Figure 5 Business Transaction Pattern Decision Tree

Form: Business Transaction	
Business Transaction Name	[Provide a name for the Business Transaction.]
Description	[A plain text explanation of the purpose and behavior of the Business Transaction.]
Select Business Transaction Pattern:	Select one of: 1) Commercial Transaction 2) Request Confirm 3) Request Response 4) Query Response 5) Information Distribution 6) Notification

Secure Transport:	[True or False,]	
Non Repudiation Required:	[True or False]	
Authorization Required:	[True or False]	
Time to Perform:	[Specify the time period that this transaction must be completed within.]	
Time to Acknowledge Receipt:	[Specify the time period that a Receipt Acknowledgement must be returned by the responding role.]	
Time to Acknowledge Acceptance:	[Specify the time period that a of an Acceptance Acknowledgement must be returned by the responding role.]	
Partner Roles		
Initiating/Requesting Partner Type	[Partner type from collaboration.]	
Initiating/Requesting Activity Role	[These are the roles that a partner must be authorized to play to issue specific transitions in the transaction (by sending certain signals).]	
Responding Partner Type	[See above.]	
Responding Partner Role	[See above.]	
Requesting Business Activity		
Activity:		
Pre-Conditions	[Business rules performed before activity is performed]	
Post-Conditions	[Business rules performed after activity is performed]	
Number of Retries:		
Information Envelope:		
Information Type:		
Information State:	[Identify the Information Envelope allowed state(s).]	
Information Security:	Are Contents Confidential?	[True or False]
	Is the Envelope Tamperproof?	[True or False]

	Authentication Required?	[True or False]
Business Information Manifest	[Enter the name(s) of the Business Information contained in envelope.]	
	Business Information Name	[Enter name]
	Information Type:	[Enter type]
	Information State:	[Identify the Business Information allowed state(s).]
	Information Security:	Are Contents Confidential?
Is the Envelope Tamperproof?		[True or False]
Authentication Required?		[True or False]
Responding Business Activity		
Activity:		
Pre-Conditions	[Business rules performed before action is executed]	
Post-Conditions	[Business rules performed after action is executed]	
Validation of Request Required:	[True or False]	
Information Envelope:	[Enter Name]	
Information Type:	[Enter Type]	
Information State:	[Identify the Information Envelope allowed state(s).]	
Information Security:	Are Contents Confidential?	[True or False]
	Is the Envelope Tamperproof?	[True or False]
	Authentication Required?	[True or False]
Business Information Manifest List:	[Enter the name of the Business Information contained in envelope]	

	Business Information Name	[Enter name]	
	Information Type:	[Enter Type]	
	Information State:	[Identify the Business Information allowed state(s).]	
	Information Security:	Are Contents Confidential?	[True or False]
Is the Envelope Tamperproof?		[True or False]	
Authentication Required?		[True or False]	

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6.2.3 Business Information

This worksheet is self explanatory.

Form: Business Information			
Business Information Name:	[Provide the name that this Business Information is identified by.]		
Description:	[A plain text explanation of the purpose and behavior of the Business Information.]		
Business Information Characteristics	Define the set of characteristics or attributes that define the structural aspects of the Business Information. Name: [Enter the name of the characteristic.] Type: [Enter the type of the characteristic. e.g. this is referred to business information.] Constraints: [The rules for defining the conditions that must be true for the inclusion and/or validation of this characteristic. These rules may be computational in format. e.g.: OCL or other formal notation.]		
Characteristics or Attributes	Name	Type	Constraint
Business Information Behavior	Define the set of operations that affect the behavioral aspects of the Business Information.		
Name:	[Enter the name of the operation.]		

Lifecycle:	[Enter the name of the lifecycle that defines this behavior.]
-------------------	---

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Normative References

925

Specification	Version	URL:
Open-edi Reference Model Standard	ISO/IEC 14662:1997	ISO/IEC 14662:1997(English) ISO/CEI 14662:1997(Français)
Business agreement semantic descriptive techniques – Part 1: Operational aspects of Open-edi for implementation	ISO/IEC 15944-1:2002	ISO/IEC 15944-1:2002
Reference Guide: The New Generation of EDIFACT	TMWGN010 R12	The Next Generation of UN/EDIFACT R12
UMM Meta-Model	UN/CEFACT TMG N091	UMM Meta-Model
UN/CEFACT eBusiness Glossary (UeB Glossary)	TBD	UN/CEFACT Electronic Business Glossary (UEB)
Martin Fowler, UML Distilled: A Brief Guide to the Standard Object Modeling Language	2nd Edition	Books by Martin Fowler

926

927 Appendix A. REA Overview

928 A.1. REA (Resource-Event-Agent) Introduction

929 Ontology, according to the most generally accepted e-commerce definition of that word, is a
 930 “specification of a conceptualization.”² The REA (Resource-Event-Agent) ontology is a
 931 specification of the declarative semantics involved in a business collaboration (or more generally
 932 in a business process). The theory behind REA comes from the field of microeconomics with
 933 specific ties in many instances to the use of economic definitions in the practice of building
 934 enterprise-wide information systems. In the UN/CEFACT work (including the BET and the
 935 BCP&MC specifications), all of the REA ontology definitions are applied to the collaborative
 936 space between enterprises where market exchanges occur in closely synchronized fashion
 937 among two or more trading partners.

938 In its most simple form without a high degree of precision, REA can be portrayed as a UML class
 939 diagram with associations and generalizations relating the object classes. The intent of this
 940 appendix is to display REA simply and to explain its basic rationale. To do so, the appendix will
 941 use a set of three figures labeled A-1, A-2, and A-3. The most advanced of the figures (A-3) is a
 942 good overall guide to the BRV semantics, given both here and in the Unified Modeling
 943 Methodology (UMM) of UN/CEFACT. This appendix will also list a series of archival publications
 944 that are freely available at the following website for readers who desire more detailed
 945 explanations (<http://www.msu.edu/user/mccarth4/rea-ontology/index.htm>).

946 A.2. The Basic REA Ontology

947 The Basic REA model was first published in the July 1982 issue of *The Accounting Review*³, the
 948 most prominent, most reliable, and most tightly controlled outlet for theoretical-based accounting
 949 work in the world. Its basic premises have withstood all challenges in the 20 years since, and its
 950 components are used extensively in a variety of educational, practical, and theoretical contexts.

951

952 Figure A-6 illustrates the basic class structure of REA ontology. The left-to-right configuration of
 953 economic **R**esources, economic **E**vents, and economic **A**gents (renamed in **UMM** as “Partner”) in
 954 a typical business collaboration pattern is the source of the model’s REA name.



955

956

Figure A-6 Basic REA Ontology

² Thomas Gruber (1993) “A Translation Approach to Portable Ontologies,” *Knowledge Acquisition*, pp. 199-220

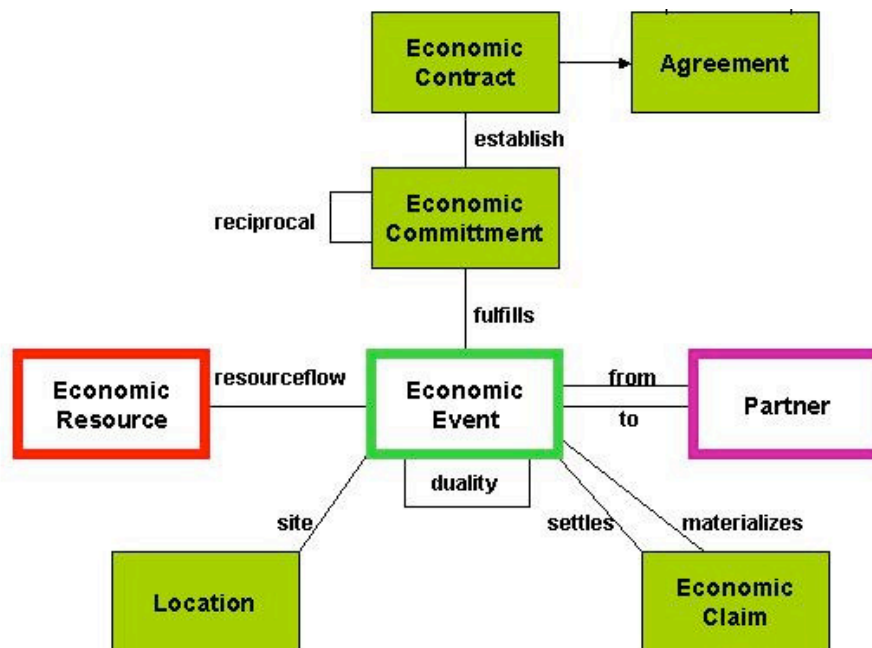
³ William E. McCarthy (1982.) “The REA Accounting Model: A Generalized Framework for Accounting Systems in A Shared Data Environment.” *The Accounting Review* (July), pp. 554-578

957 A successful business collaboration involves first and foremost two types of *Economic Events*,
 958 each of which details the *Economic Resources* involved in an exchange between two Trading
 959 *Partners*. For example, a Supplier (Trading Partner) transfers ownership of an Automobile
 960 (Economic Resource) to a Customer (Trading Partner) in return for which (*duality* association) the
 961 Customer will provide Money (Economic Resource) to the Supplier. There are two mirror-image
 962 instantiations of the object pattern shown in Figure A-1 where one transfer represents the legal or
 963 economic consideration given for the other.

964 The declarative semantics shown here are central to all trading relationships. Economic
 965 Resources are objects that have value and are under the control of one of the two collaborative
 966 agents. Trading partners always expect required transfers of resources when they engage in
 967 commerce. Hence, Figure A-6 is a pattern for all economic exchanges.⁴

968 A.3. Adding Commitments to the Basic Exchange Ontology

969 In electronic commerce, the actual trading phase of an exchange is accommodated well by the
 970 object structure shown above in Figure A-6. However, trading partners in long-term relationships
 971 need more trusted and predictable structures where both parties contract for their exchange
 972 behavior in advance. The REA ontology accommodates this expansion with the addition of the
 973 classes shown as *Economic Commitments*, *Economic Contract*, and *Agreement* in Figure A-7.



974
 975 **Figure A-7 REA Ontology with Commitments**

976 A *Commitment* is a promise by a Trading Partner to initiate an Economic Event in the future.
 977 Performing the Economic Events *fulfills* that Commitment. Commitments should always be
 978 *reciprocated* by the other Trading Partner who commits to initiate another type of Economic Event
 979 in return. An *Economic Contract* is a bundle of reciprocating commitments between Trading
 980 Partners who bind themselves to one or more economic exchanges in the future. A contract is a
 981 subtype of the more general object class called *Agreement*, and Agreements can regulate other
 982 Agreements.

983 In the case of the automobile-for-money exchanges discussed in the prior section, Commitments

⁴ G. Geerts and W.E. McCarthy (1999). "An Accounting Object Infrastructure For Knowledge-Based Enterprise Models." *IEEE Intelligent Systems & Their Applications* (July August 1999), pp. 89-94

984 would involve the Customer agreeing to accept delivery of an Automobile on a certain date in
985 return for which he or she would be contractually obligated to making a series of Cash payments
986 to the Supplier for that purchase.

987 In the bottom part of Figure A-7, two additional objects of the REA ontology are illustrated: *Claims*
988 and *Locations*.

989 Materialization of *Claims* is sometimes needed when Trading Partners insist on docu-
990 mentation of partially completed exchanges (for example, when a Customer takes pos-
991 session of an Automobile before paying for it in full). If needed, Claims can be instanti-
992 ated by documents like invoices or by accounting artifacts like accounts-receivable. Their
993 inclusion here is more a matter of business custom than ontological completeness.

994 A *Location* is another object that is sometimes needed to fill out the specification for a full
995 economic transfer. Locations simply identify the place where Economic Events take
996 place.

997 The economic and ontological foundations of commitments are explained more completely by
998 Geerts and McCarthy.⁵

999 **A.4. Adding Types to the Basic REA Exchange Ontology**

1000 The object pattern portrayed in Figure A-7 above is primarily *descriptive* in the sense that it
1001 illustrates what actually occurred in an economic exchange or what has been committed to. In the
1002 **UMM**, these *descriptive* components have been augmented by *prescriptive* components that
1003 allow the specification of control policies or collaboration patterns. These prescriptive components
1004 are enabled by the inclusion of type images of the basic descriptive objects⁶. The class diagram
1005 of Figure A-8 shows these additions.

⁵ G. Geerts and W.E. McCarthy (2000) "The Ontological Foundation of REA Enterprise Information Systems," paper presented to the Annual Meeting of The American Accounting Association, August 2000.

⁶ G. Geerts and W.E. McCarthy (2002) "An Ontological Analysis of the Primitives of the Extended-REA Enterprise Information Architecture," *The International Journal of Accounting Information Systems* (Vol. 3), pp. 1-16.

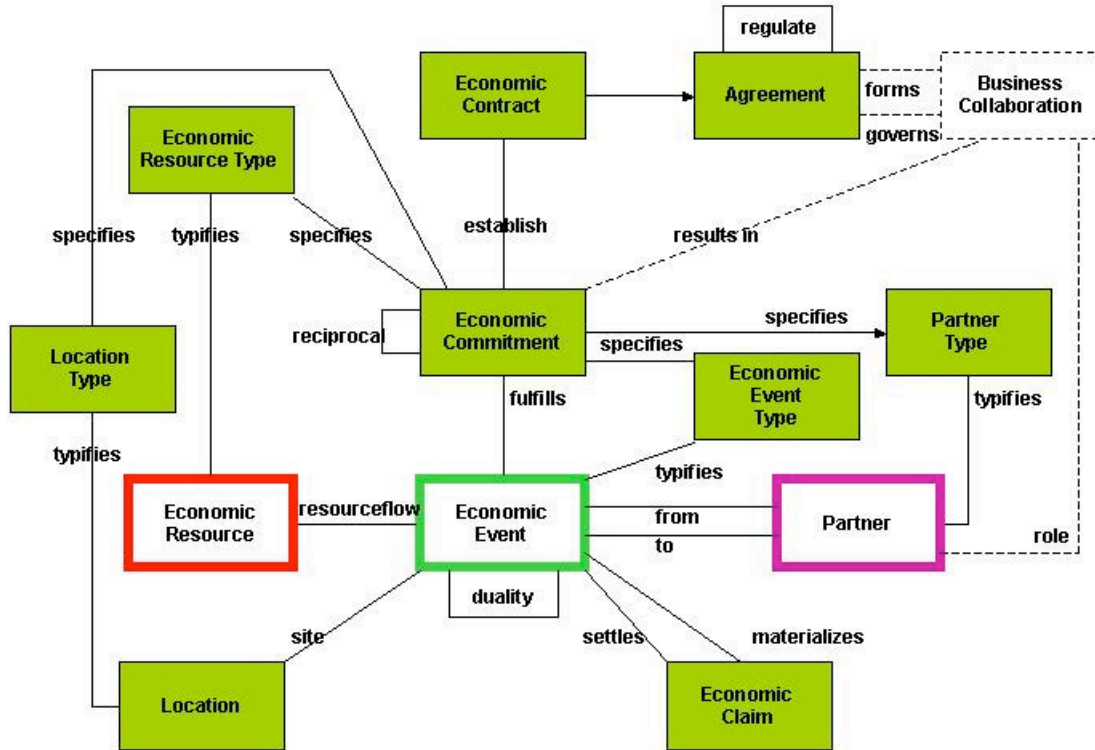


Figure A-8 REA Ontology with Types

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1007

1008 The addition of Types to Figure A-8 proceeds in two stages:

1009 The three base descriptive classes – Economic Resource, Economic Event, and Partner
 1010 (Economic Agent) – have classes added for their types. These new classes are connected to
 1011 the descriptive objects by *typifies* associations. An example of a Resource Type could be
 1012 different models of automobiles. An example of Economic Event Type could be the classes of
 1013 retail transaction and wholesale transactions, each with different pricing structures. An
 1014 example of Partner Type could be different classes of employees, each type with separate
 1015 training requirements. Additionally, the class Location is also typified. An example of Location
 1016 Type might be different types of loading docks with different sizes and stress capability levels.

1017 The full design of the Economic Commitment would necessitate associations with between
 1018 the commitment and each of the new type-level objects. These are illustrated in the figure
 1019 with *specifies* associations.

1020 In addition to these two groups of additions, there are other REA associations in the UMM (and in
 1021 the BET specification and the BCP&MC specification) that are not illustrated here in an effort to
 1022 minimize diagram complexity. These include:

- 1023 Partner – *responsible* -- Contract
- 1024 Partner -- *participates* – Agreement
- 1025 Agreement Type – *typifies* - Agreement
- 1026 Partner – *participates* – Economic Commitment
- 1027 Economic Commitment – *reserves* – Economic Resource
- 1028 Economic Commitment – *destination* – Location

1029

1030 And finally with regard to Figure A-8, the partial integration of the elements of the REA ontology
 1031 with the components of the UMM business collaboration framework is illustrated by showing the
 1032 class for Business Collaboration (with dotted lines) and some of its associations with REA classes

1033 (also illustrated with dotted lines). Outside of its use with the UMM and the attendant
1034 specifications, the REA ontology has a three-level architecture that is explained by Geerts and
1035 McCarthy.⁷ In the UMM, this three-level architecture is effected by the integration of REA
1036 components within the business collaboration framework and by the connection of the Business
1037 Requirements View (BRV) to the to the Business Domain View (BDV) above it and the Business
1038 Transactions View (BTV) below it.

⁷ G. Geerts and W.E. McCarthy (2001). "Using Object Templates from the REA Accounting Model to Engineer Business Processes and Tasks," *The Review of Business Information Systems*, vol. 5, no. 4, pp. 89-108.

1039 **Appendix B. UMM Worksheet Example**

1040

1041 **Introduction to UMM Worksheet Example**

1042

1043 This simple example deals with a start-up business that would like to sell products to the public
1044 using an electronic catalogue. The following is the information that may be gathered by business
1045 analysts and modelers after interviewing various management personnel:

1046

1047 **Order From Catalog Business Case**

1048 To order from a Seller's catalogue the Buyer determines whether he has a current catalogue of
1049 the Seller or not. If not, the Buyer sends a request for the catalogue and the Seller returns the
1050 electronic version of the catalogue.

1051 Having the catalogue, the Buyer decides whether he wants to order a product(s) from the
1052 catalogue. If not the transaction is completed.

1053 If the Buyer decides to place an order, he must verify whether he is already registered with the
1054 Seller (since a Seller accepts only registered Buyers). If the Buyer is not already registered, he
1055 sends his Buyer information. After verification of the Buyer information and credit, the Seller
1056 returns a Buyer ID.

1057 Before ordering, the Buyer verifies whether the current price of the product is available. If not, the
1058 Buyer will request a price quote and the Seller returns the price quote. Note that only a
1059 registered Buyer can request a price quote. Note also that a request for a price quote, as well as
1060 orders, may be reviewed and approved by regulatory authorities. On the basis of the price quote
1061 the Buyer decides to order the product(s) or not. If not, the transaction is completed.

1062 If the Buyer wants to order the product(s) (according either to the already known price information
1063 or to the requested price quote) he sends an order to the Seller. Once the order is accepted and
1064 the product is shipped, the Seller will debit the Buyer's credit card and send the Buyer a shipment
1065 notice.

1066 Until the Buyer has received the ordered product, he can decide to request the order status from
1067 the Seller. The Seller then returns the order status information. The cycle of requesting order
1068 status and sending order status information might be executed multiple times.

1069 When the Buyer receives the ordered product the transaction will be successfully completed.

1070 The whole workflow can be executed multiple times (whenever the product(s), a catalogue or a
1071 price request is needed).

1072 This main workflow does not consider any exceptions in the business case.

1073 It is assumed that the Buyer may not cancel or change an order once an order number has been
1074 issued.

1075

1076 **Note: As you work through this example, the process of gathering information for the**
1077 **various work areas is iterative. As one works through the various views new information**
1078 **will be discovered and previous worksheets may need to be updated to reflect any**
1079 **changes.**

1080

1081

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The first worksheet is for administrative purposes. A model name is chosen that reflects the overall purpose of this model so that others can easily determine if it's appropriate for their environment.

1084

1085

Worksheet: Business Model Administration Information	
Model name	[Provide a representative name for the total model.] Order From Catalog
Analysts/Modelers	[Provide a list of names of people who are participating in the business process analysis effort. Specify email addresses between angle brackets such as for John Doe <john@company.com>] TMG User Guide Contributors
Model Owner	[Name of the organization sponsoring the analysis activities or that will own the resultant model. For example, UN/CEFACT.] UN/CEFACT
Identifier Information	
Agency Id	[The identifier of the organization that owns the business process model (or some subset there of). This is used in conjunction with the Agency field. This information is case sensitive; lower case is recommended. Examples are EAN identifiers and internet domain names.] NA
Agency	[The name of the agency, which owns or controls the Agency Id values. This information is used to create the BPINs identifiers. This information is case sensitive; lower case is recommended. For example, icann (for ICANN internet domain names) or eann (for EAN identifiers).] NA

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BDV Example Worksheets

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The following Business Domain Ontology diagram shows the Business Areas and Process Areas in the Business Domain View. This is only an example to illustrate this model.

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Business Domain View

Process	Marketing	Ordering	Distribution	Settlement	Regulatory
Business					
Manufacturing	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)
Financial	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)
Retail	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)
Transport	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)
Services	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)

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 1094
 1095
 1096
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 1101

Step 1 - Identify and Describe Business Area(s)

Before focusing on the Business Areas, the entire Business Domain is described, using the previous diagram as a reference.

Form: Describe Business Domain Model	
Business Domain Model Name	[Provide a name for the reference model. You can use an existing reference model such as the Supply Chain Council or the Porter's Value Chain or create your own name.] Simplified eBusiness Domain
Description	[A brief summary of this domain.] Business domain of an enterprise that produces products and services for Buyers
Industry	[Provide the name of the industry that this business applies to. Search the business process library for a list of possible industrys. If the industry does not exist, then provide an appropriate name/label for the industry.] eBusiness Retail

Business Areas	<p>[List the business areas within the scope. A business area is a collection of process areas. A process area is a collection of business processes. You may wish to refer to the ebXML Catalog of Business Processes that provides a list of normative categories that may be used as business areas.]</p> <p>Manufacturing</p> <p>Retail</p> <p>Financial</p> <p>Transport</p> <p>Services</p>
Business Justification	<p>[Provide the business justification for the collection of business processes]</p> <p>Products and services are provided by the enterprise to Buyers for profit</p>
Category Schema	<p>[Provide the name of the categorization schema used to categorize business processes in the industry.]</p> <p>eBusiness Retail</p>
Stakeholders	<p>[Identify the practitioners that care about the definition of this business domain. At this level, this is likely to be some participants in an industry group (perhaps a standards body or an enterprise). These are the people who will define the BRV.]</p> <p>Seller</p> <p>Buyer</p> <p>Stockholders</p> <p>Enterprise officers who set policy</p> <p>Bank</p> <p>Government Agencies</p>
References	<p>[Any external supporting documentation.]</p> <p>Standard Operating Procedures</p> <p>Implementation Guide</p> <p>U.S. Tax Code</p>

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A worksheet is created for each Business Area that needs to be modeled in the business domain. The example involves a company that sells various products from a catalog so, in this case, the Business Area is Retailing. Within this Business Area all of the possible Process Areas are identified by using the Business Domain View diagram.

Form: Describe Business Area	
Business Area Name	[Provide a name for the business area. This should be listed in the Business Areas section of the Business Domain Model.] Retail
Description	[A brief summary of this functional area.] Seller's provision of goods to Buyers.
Scope	[Provide a high level statement that encapsulates the scope of this business area.] Seller fulfills commitment to provide goods to a Buyer, and Buyer fulfills commitment to pay Seller for goods provided
Process Areas	[List the process areas within the scope. A process area is a collection of business processes.] Marketing Ordering Distribution Settlement Regulatory
Objective	[Describe the objective of this business area.] To enable a Buyer to procure a product from a Seller
Business Opportunity	[Describe the business opportunity addressed by this business area.] Products are provided by the Seller to a Buyer for profit
Category	[Provide the category identifier used to reference a business area set of business processes. This should be within the category schema.] Retail
Business Areas	[List any other business areas that may be within the scope this business area.] None

1109

1110 **Step 2 - Identify and Describe Process Area(s)**

1111

1112 *In this step, the Process Areas to be modeled are identified and a worksheet is created for*
 1113 *each one. This example involves the ordering of products from a catalog and the payment*
 1114 *of the order using a credit card. As result, the Ordering and Settlement Process Areas will*
 1115 *be modeled.*

1116

1117

Form: Describe Process Area	
Process Area Name	[Provide a name for the process area. This should be listed in the Process Areas section of at least one Business Area.] Ordering
Description	[A brief summary of this functional area.] The Buyer orders goods with reference to the Seller's catalogue, with or without a price quote.
Objective	[Describe the objective of this process area.] To enable a Buyer to order a product from a Seller's catalogue.
Scope	[Provide a high level statement that encapsulates the scope of this process area. The scope of this process area must be within the scope of the encompassing business area. Typically the scope of the process area will be more constrained or limited than the scope of the corresponding business area.] Seller fulfills commitment to deliver ordered goods to a Buyer, and Buyer fulfills commitment to pay Seller for ordered goods.
Business Opportunity	[Describe the business opportunity addressed by this process area.] The process of ordering products from catalogue is a common way of conducting business. The advantage of this way of doing business is that the Buyer can look through the Seller's products at his favorable place without any need to visit the store of the Seller. Ordering from catalogue is especially appropriate for standardized products as well as for products that can be exactly described by certain product characteristics. Furthermore, the catalogue itself serves as a marketing instrument for the Seller.
Category	[Provide the category identifier used to reference a business area or process area set of business processes.] Ordering within Retail
Business Processes	[List the business processes within the scope of this process area.] Obtain Customer ID Obtain Product List

	Obtain Quote Place Order Obtain Order Status
Process Areas	[List any other process areas that may be within the scope this process area.] None

1118

1119 **Note: Normally, a similar worksheet would also be created for the Settlement Process**
 1120 **Area within this Business Area. This worksheet would contain a Debit Credit Card**
 1121 **business process.**

1122

1123

1124 *From the Business Domain View, Retail Ordering and Retail Settlement are the Business*
 1125 *Process Areas that are relevant to the business case.*

1126

1127

1128

Simplified eCommerce Business Areas/Process Areas within Business Domain

Business Domain View					
Process	Marketing	Ordering	Distribution	Settlement	Regulatory
Business					
Manufacturing	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)
Financial	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)
Retail	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)
Transport	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)
Services	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)	Business Process Area (package)

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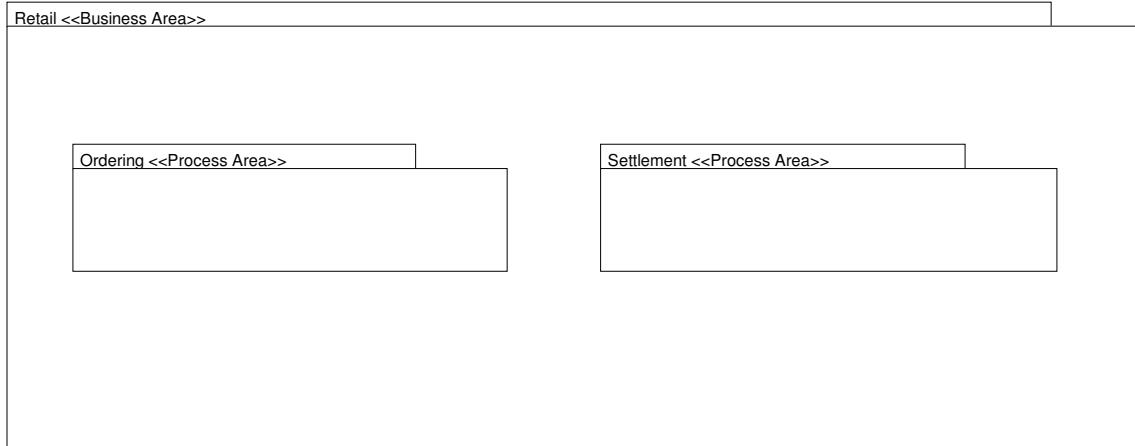
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The business domain structure is illustrated using a UML package diagram. A package diagram is used to emphasize the organizational structure of the business areas and the process areas within them.

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Business Area/Process Area Packages



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Step 3 - Identify Business Process(es)

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This worksheet provides a link to the Business Process worksheet in the BRV. High level requirements, such as interdependencies with other Business Processes are noted here. Detailed requirements are left to the Business Process worksheet.

1150

Form: Identify Business Process	
Business Process Name	[Name of the business process as identified in the above Process Area.] Obtain Customer ID
Description	[A plain text explanation of the purpose and behavior of the Business Process] The Buyer orders goods mentioned in the catalogue. The Buyer may request a price quote (e.g. when the unit price amount of a product is not specified in the catalogue) before actually placing the order. In this case, the Seller first returns the price quote. In both cases, the Seller returns an order confirmation.

Business Processes	[List any business processes that depend upon, are associated with, or contained within this business process.] none
Business Requirements	[High level requirements, such as interdependencies with other Business Processes are noted here.] none

1151

1152 Note: This worksheet could be created for each business process within the Ordering and
 1153 Settlement Process Areas. Keeping in mind that this will be done more specifically in the BRV,
 1154 this example details just one of the business processes within the Ordering Process Area. .

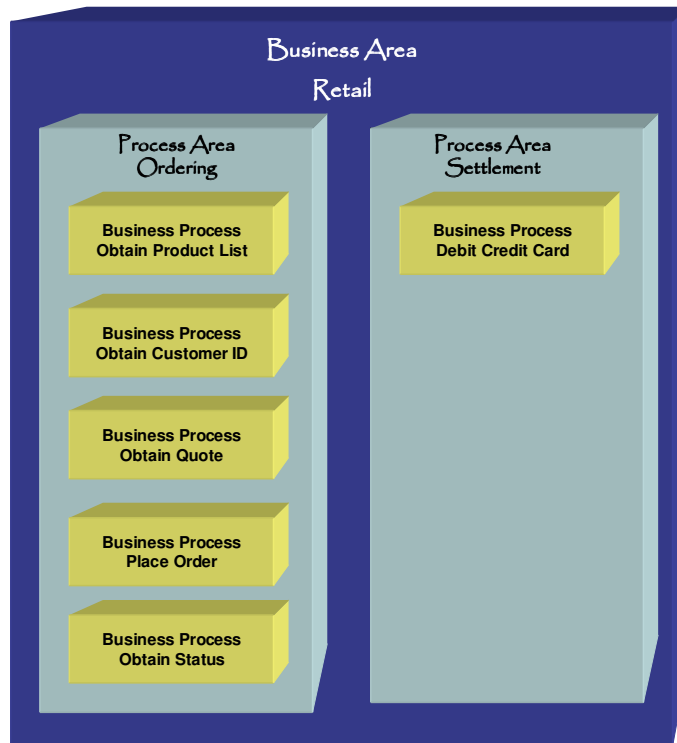
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1157 *The following is what we have identified as our model after completing the BDV*
 1158 *worksheets.*

1159

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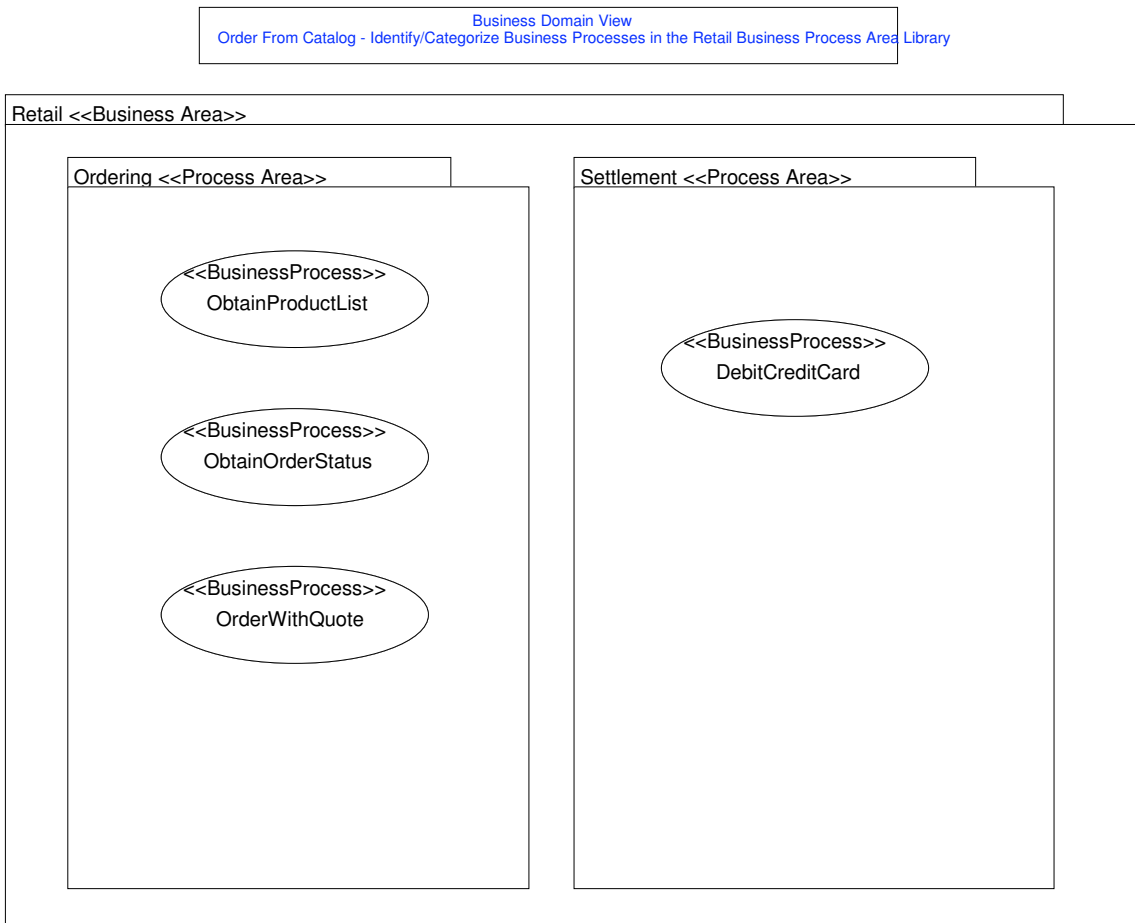
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The Business Process Area Library (Repository) is searched and business process models with similar Business and Process Areas, as well as Business Processes, are found as shown below.

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1167

Identification/Categorization of Business Processes within Business and Process Areas currently available in a Library (Repository)



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Step 5 - Identify Business Processes from the BP Library

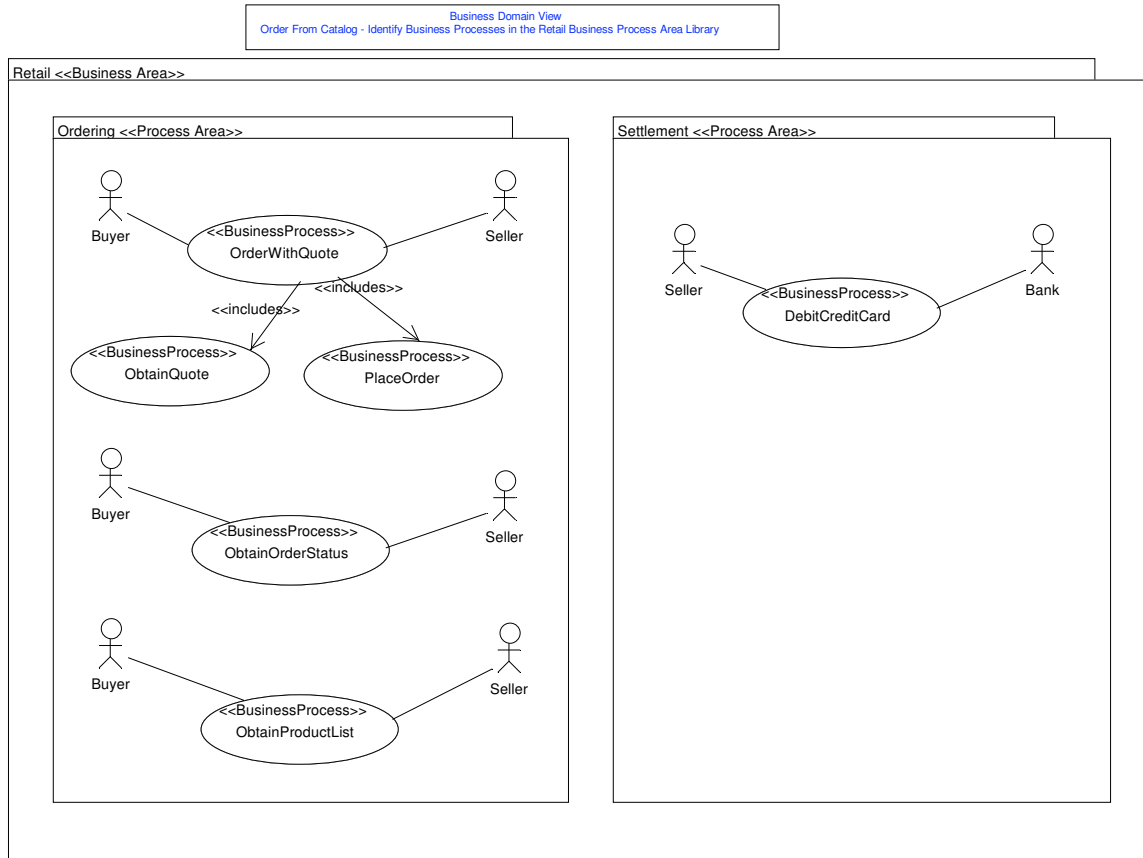
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Looking in more detail at the business process models from the library, the OrderWithQuote business process model is comprised of two business process models which may be reused – ObtainQuote and PlaceOrder.

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BDV Use Case Diagrams for Library supported Business Processes



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Step 4 - Identify and Finalize Business Processes and Partners

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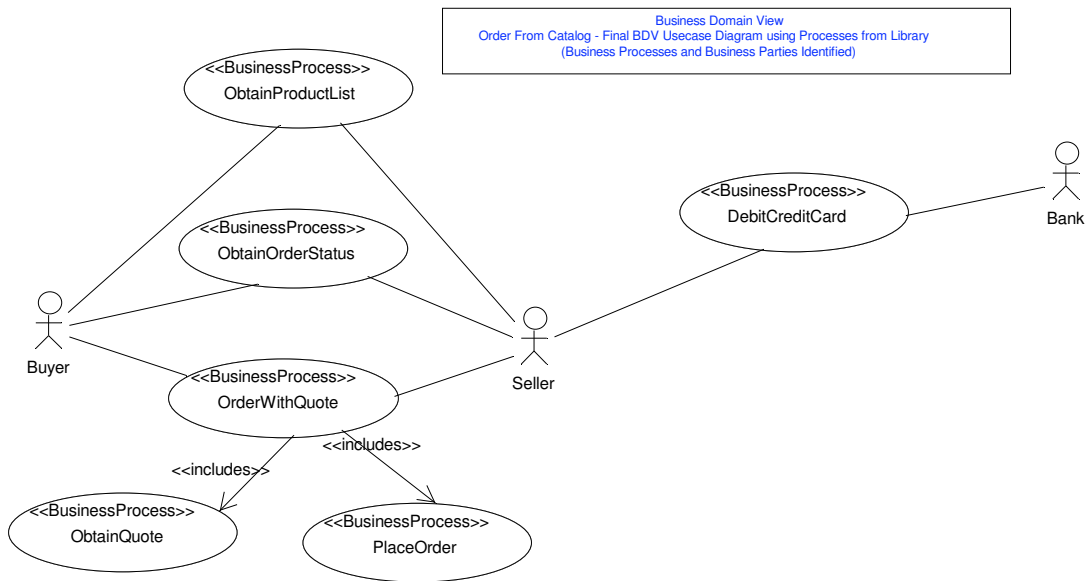
The relationships between the Business Partners and Business Processes identified from the library are shown below. This UML Use Case diagram illustrates that the Seller not only collaborates with the Buyer but with the Bank as well.

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1190

1191 **Final BDV Use Case Diagram Using Processes from Library**

1192



1193

1194

1195 **BRV Example Worksheets**

1196

1197 **Step 1 - Describe REA Elements and Activities of the Business Process Phases**

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1200

1201 The generic business collaboration pattern of ‘commitment – fulfillment’ is determined at this point
 1202 using the REA worksheets. Business requirements identified in completing the REA worksheets
 1203 are used as input to the BRV work area.

1204 There are three columns in the REA worksheet that correspond to the five ISO business process
 1205 phases. The first column combines both the Planning and Identification phases. At this point in
 1206 the business process, the buyer and seller are involved in deciding what needs to take place
 1207 before acquiring or selling a good, service, and/or right as well as determining what data needs to
 1208 be exchanged to establish their relationship. As in the case of our example, these would be any
 1209 business processes which take place prior to those involving price or order commitments.

1210 The Negotiation phase is directed at achieving an explicit, mutually understood, and agreed upon
 1211 goal of a business collaboration and associated terms and conditions. This may include such
 1212 things as the detailed specification of the good, service, and/or right, quantity, pricing, after sales
 1213 servicing, delivery requirements, financing, use of agents and/or third parties, etc. .

1214 In this example the pricing is agreed upon (or not) during the Obtain Price Quote business
 1215 process and the Place Order business process contains information such as the product, quantity
 1216 and agreed-upon price.

1217 The third column combines the Actualization and Post Actualization Phases. It pertains to all
 1218 activities or events necessary to insure that the agreed upon good, service, and/or right is
 1219 deemed to have been delivered and reciprocated.

1220 In this example, once the order is placed the product is shipped, the product is paid for, and in the
 1221 meantime the status of the order may be checked.

1222 _____
 1223
 1224

Form: REA Worksheet			
Overall Business Process REA Elements	Business Process Name	Order From Catalog	
	Resources	Product for Credit Card Charge	
	Proposed Business Partners	Buyer, Seller, Banker, Shipper	
ISO Business Phases	Planning/Identification	Negotiation	Actualization/ Post-Actualization
Activities Performed	Obtain Product List Obtain Customer ID	Obtain Quote Place Order	Obtain Order Status Notify of Shipment Debit Credit Card
Business Entities (candidates)			
Collaborative Business Partners	Retailer, Customer, Banker	No additional partners	Shipper
Types of Identified Resources	Product List Credit Card Charge	Product ID with agreed price	
Types of Events, Locations, or Partners To Be Specified		Approved Express Shipper	
Specific Commitments (two min.)		Commitment to ship product in one delivery Commitment to pay upon notice of delivery	
Specific Contract or Agreement		Catalog Order	
Exchanged Resources (two min.)			Product for Credit Card Charge
Exchanged Events (two min.)			Shipment of Product Payment by Credit Card

Actual Location (if needed)			Not Needed
Materialized Claim (if needed)			Not Needed
Possible Exception Conditions	Rejection of Credit	Price not agreed upon	Product not Shipped
Phase Completion Criteria (expressed as entity states if possible)	Retailer, Customer and Banker are 'identified' Product and Credit Card are 'identified'	Catalog Order and commitments are 'in-force' Product and Credit Card are 'specified' Approved Shipper is 'specified'	Shipment and payment are 'complete' Credit Card charge and Product are 'transferred' Commitments are 'fulfilled'

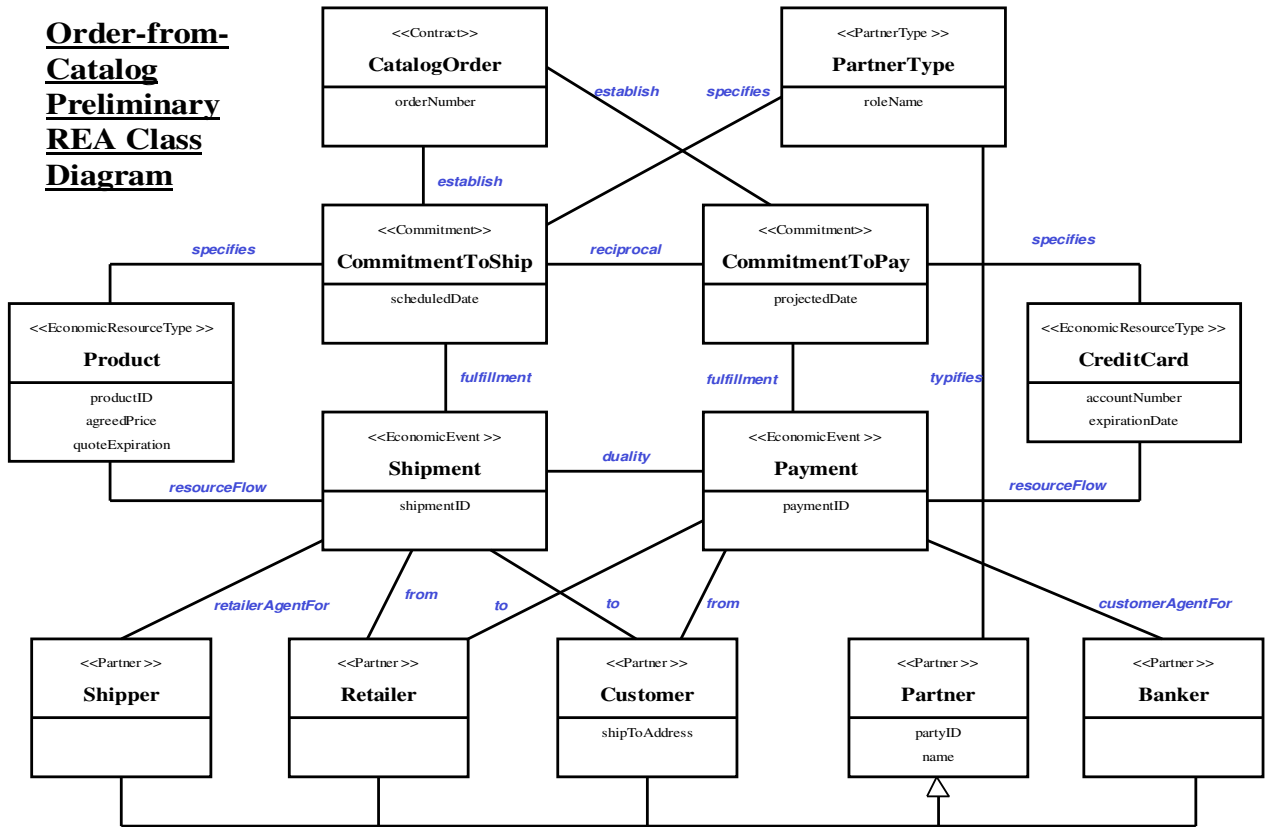
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1227 **REA Class Diagram of Business Process (see appendix A for class**
1228 **descriptions)**

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Order-from-Catalog Preliminary REA Class Diagram

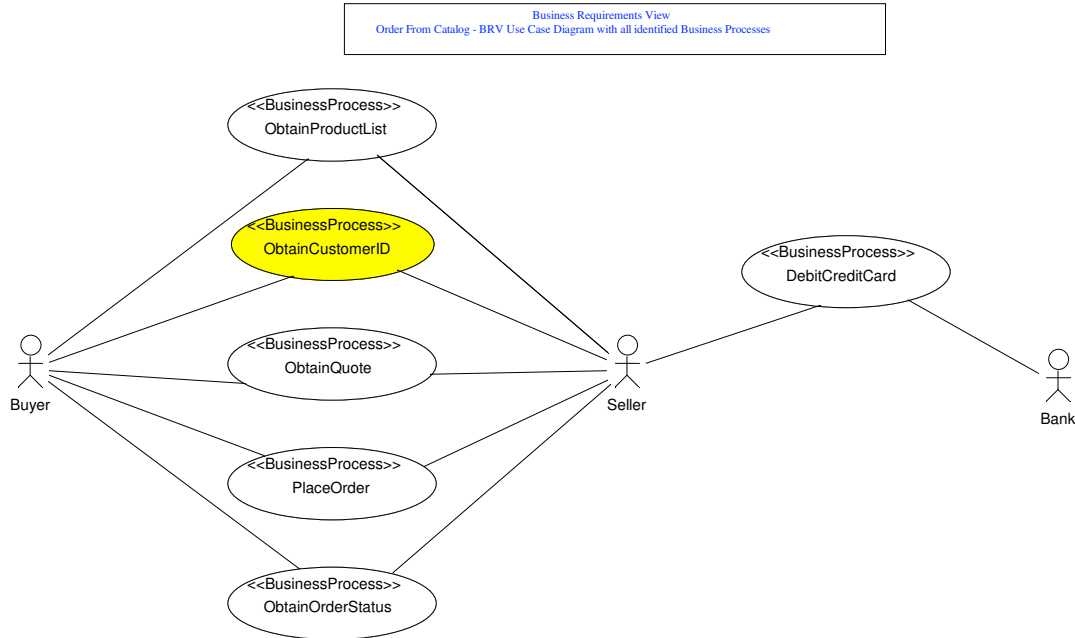


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1233 **Step 2 - Describe each business process (from BDV and REA) in more**
 1234 **detail**

1235

1236



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1239

1240 *This example will be reusing five business processes involving three business partners*
 1241 *from the business process models found in the library. Since the library does not contain*
 1242 *a business process model for Obtain Customer ID, it needs to be created.*

1243 *Note: In the following worksheets there will be entries that are italicized in 'California*
 1244 *Navel' orange. These are entries added later on in the BRV following the discovery of an*
 1245 *additional business process in this example.*

1246

1247

Form: Business Process	
Business Process Name	[Provide a name for the business process. This should be a name identified on the form "Identify Business Process" and on a "Describe Process Area" form.] <i>Obtain Customer ID</i>
Description	[A plain text explanation of the purpose and behavior of the Business Process] A Buyer finds one or more items in a Catalog that the Buyer needs. However, since the Buyer has never conducted business with the Seller before, the Seller requires buyer information before any catalog order can be placed. Upon

	<p>receiving the required buyer information, including verification of credit, the Seller assigns the Seller's Buyer ID. This identification can then be used to receive price quotes on products offered by the Seller, or to place a catalog order. The benefit of a Buyer having provided information about itself prior to ordering is that the amount of information to be exchanged and the number of steps required to subsequently request a price quote or place a catalog order are reduced. This results in saving both the Buyer and the Seller processing time, reducing the cost of doing business.</p>
Business Requirements	[The list of business requirements that apply to this business process. The format of requirement definition is covered (as shown in Annex 4, Business process Specification Template, in the UMM).]
Definition	<p>[A set of simple sentences that state actions may be performed as part of the business process.]</p> <p>Obtain Customer ID</p>
Participants	<p>[List the type of partners involved in the business process. E.g. manufacturer, supplier, customer]</p> <p>Seller</p> <p>Buyer</p>
Preconditions	<p>[Preconditions are the rules defining the conditions that must be true for the context that this process is conducted within. These rules are constraints that must be satisfied before instantiating or initializing the business process thus ensuring that the proper context for the process has been established.]</p> <p>Valid Catalog on Hand</p> <p>No Valid Customer ID From This Seller</p>
Begins When	<p>[Identifies the event(s) from that start this business process.]</p> <p>ID Request</p>
Ends When	<p>[[List all the event(s) that causes normal completion of the business process.]</p> <p>Send Response</p>
Exceptions	<p>[List all exception conditions (events) that will cause the business process to terminate before its normal completion.]</p> <p>Response Date Exceeded</p>
Post-conditions	<p>[Post-conditions are the rules defining the conditions that must be true for the localized context that exists after the business process completes. These rules are constraints that must be satisfied after</p>

	the business process thus ensuring that the proper update to context of the parent process has been occurred.] Buyer receives Customer ID or Rejection
Supporting Business Collaborations and/or Business Processes	[List the business collaborations and business processes that support (are part of) this business process.] None
Lifecycle(s)	[Identify the Lifecycle(s) (Activity Model) that formalizes the definition of this Business Process.] None

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Step 3 - Identify and Describe Business Collaborations

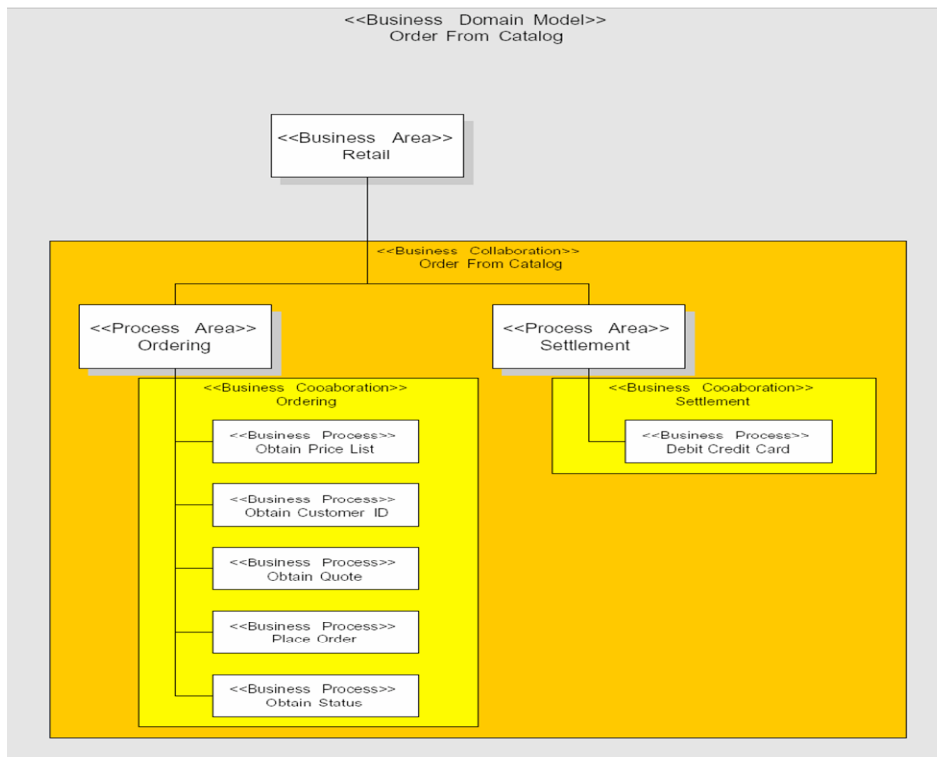
1253

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As the first part of this step, three Business Collaborations are identified from the business processes that have been described thus far. The Order From Catalog Business Collaboration is composed of the Ordering and Settlement Business Collaborations.

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1263 *In next part of this step, starting with the largest of the three collaborations we have*
 1264 *identified, it will be broken down into smaller business collaborations which need to be*
 1265 *further described until business transactions are identified and described.*

1266 *The Business Collaboration Specification worksheet is an extension of the Business*
 1267 *Process Worksheet, thus many aspects of the description of the Business Process*
 1268 *worksheet (above) pertain to this worksheet as well.*

1269 *There are two types of business collaborations. A business collaboration protocol is a*
 1270 *business collaboration at a low enough level that it can be represented by an activity*
 1271 *graph, comprised of business transactions, each with object states specified as*
 1272 *preconditions and post-conditions. Business transactions are the atomic level business*
 1273 *collaborations according to the six business transaction patterns. The same Business*
 1274 *Collaboration Specification worksheet is used for these two types of business collabora-*
 1275 *tions.*

1276 *The largest business process, Order From Catalog, involves two or more actors so it is*
 1277 *considered a business collaboration. Since it can be further broken down into other*
 1278 *business collaborations and/or transactions, it's a Business Protocol type of collaboration*
 1279 *rather than a Business Transaction type.*

1280 *The metrics field in this worksheet is a link to the business process metric worksheet,*
 1281 *which requests detailed information.*

1282 *There is also a Business Collaboration Specification worksheet for the Ordering Business*
 1283 *Process and its six supporting business collaborations as well as the Settlement Business*
 1284 *Process. To keep this document a reasonable size, the Order From Catalog, Ordering,*
 1285 *and Obtain Customer ID business collaborations will be modeled.*

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1287

1288

Form: Business Collaboration Specification	
Business Collaboration Specification Name	[Provide a name for the Business Collaboration] Order from Catalog Specification
Business Collaboration Specification Type	[Choice between Business Collaboration Protocol or Business Transaction Specification.] Business Collaboration Protocol
Description	[A plain text explanation of the purpose and behavior of the Business Collaboration Specification] The Buyer orders goods mentioned in the catalogue. The Buyer may request a price quote (e.g. when the unit price amount of a product is not specified in the catalogue) before actually placing the order. In this case, the Seller first returns the price quote. In both cases, the Seller returns an order confirmation. After processing the order the Seller contacts the Bank and debits the Sellers credit card. At anytime the Buyer can check the status of his order.

Definition	[A set of simple sentences that state the actions performed as part of the business process.]
Participants	[List the type of partners involved in the Business Collaboration, e.g. manufacturer, supplier, customer.] Buyer Seller Banker
Preconditions	[Preconditions are the rules for defining the conditions that must be true for the context that this process is conducted within. These rules are constraints that must be satisfied before instantiating or initializing the Business Collaboration thus ensuring that the proper context for the process has been established.] NA
Begins When	[Identifies the event(s) from that start this Business Collaboration.] NA
Ends When	[List all the event(s) that causes normal completion of the Business Collaboration.] Seller Paid Product Shipped
Exceptions	[List all exception conditions (events) that will cause the Business Collaboration to terminate before its normal completion.] Seller Not Paid Product not Shipped
Post-conditions	[Post-conditions are the rules for defining the conditions that must be true for the localized context that exists after the Business Collaboration completes. These rules are constraints that must be satisfied after the business process thus ensuring that the proper update to context of the parent process has been occurred.] <i>Buyer Notified of Shipment</i> Seller is Paid Shipment Notice Received by Buyer
Realization	What Business Collaboration is used to realize or instantiate this Business Collaboration Specification Order from Catalog Collaboration
Business Requirements	[The list of business requirements that apply to this Business Collaboration. The format of requirement definition is covered (as shown in Annex 4, Business process Specification Template, in the UMM).] Process must support both domestic and international sales.

	Price Quote Request against non-current catalogs is not valid.
Supporting Business Collaborations (including Business Transactions and Collaboration Protocols)	[List the business transactions and business collaboration protocols that support (are part of) this business collaboration.] Order Collaboration Settlement Collaboration
Lifecycle(s)	Identification of the Lifecycle(s) (Activity Model) that formalizes this Business Collaboration. Order from Catalog Lifecycle
Metrics	[List of Metrics to be recorded for this business process/collaboration]
	Initiating: None
	Responding: None

1289

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Form: Business Collaboration Specification	
Business Collaboration Specification Name	[Provide a name for the Business Collaboration] Ordering Specification
Business Collaboration Specification Type	[Choice between Business Collaboration Protocol or Business Transaction Specification .] Business Collaboration Protocol
Description	[A plain text explanation of the purpose and behavior of the Business Collaboration Specification] The Buyer orders goods mentioned in the catalogue. The Buyer may request a price quote (e.g. when the unit price amount of a product is not specified in the catalogue) before actually placing the order. In this case, the Seller first returns the price quote. In both cases, the Seller returns an order confirmation. At anytime the Buyer can check the status of his order.
Definition	[A set of simple sentences that state the actions performed as part of the business process.]
Participants	[List the type of partners involved in the Business Collaboration, e.g. manufacturer, supplier, customer.] Buyer Seller

Preconditions	<p>[Preconditions are the rules for defining the conditions that must be true for the context that this process is conducted within. These rules are constraints that must be satisfied before instantiating or initializing the Business Collaboration thus ensuring that the proper context for the process has been established.]</p> <p>NA</p>
Begins When	<p>[Identifies the event(s) from that start this Business Collaboration.]</p> <p>NA</p>
Ends When	<p>[List all the event(s) that causes normal completion of the Business Collaboration.]</p> <p>Product Shipped</p> <p><i>Buyer Notified of Shipment</i></p>
Exceptions	<p>[List all exception conditions (events) that will cause the Business Collaboration to terminate before its normal completion.]</p> <p>Product not Shipped</p>
Post-conditions	<p>[Post-conditions are the rules for defining the conditions that must be true for the localized context that exists after the Business Collaboration completes. These rules are constraints that must be satisfied after the business process thus ensuring that the proper update to context of the parent process has been occurred.]</p> <p>Product Shipped</p> <p><i>Buyer Notified of Shipment</i></p> <p><i>Shipment Notice Received by Buyer</i></p>
Realization	<p>What Business Collaboration is use to realize or instantiate this Business Collaboration Specification</p> <p>Ordering Collaboration</p>
Business Requirements	<p>[The list of business requirements that apply to this Business Collaboration. The format of requirement definition is covered (as shown in Annex 4, Business process Specification Template, in the UMM).]</p> <p>Process must support both domestic and international sales.</p> <p>Price Quote Request against non-current catalogs is not valid.</p>
Supporting Business Collaborations (including Business Transactions and Collaboration Protocols)	<p>[List the business transactions and business collaboration protocols that support (are part of) this business collaboration.]</p> <p>Obtain Product List</p> <p>Obtain Customer ID</p> <p>Obtain Price Quote</p> <p>Place Order</p> <p>Obtain Status</p>

	Notify Buyer of Shipment
Lifecycle(s)	Identification of the Lifecycle(s) (Activity Model) that formalizes this Business Collaboration. Ordering Lifecycle
Metrics	[List of Metrics to be recorded for this business process/collaboration]
	Initiating: None
	Responding: None

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1294 *The Obtain Customer ID business process is a business transaction type of collaboration*
 1295 *since it can not be further broken down into other business collaborations and/or*
 1296 *transactions.*

1297

1298

Form: Business Collaboration Specification	
Business Collaboration Specification Name	[Provide a name for the Business Collaboration] Obtain Customer ID Specification
Business Collaboration Specification Type	[Choice between Business Collaboration Protocol or Business Transaction Specification .] Business Transaction Specification
Description	[A plain text explanation of the purpose and behavior of the Business Collaboration Specification] A Buyer finds one or more items in a Catalog that the Buyer needs. However, since the Buyer has never conducted business with the Seller before, the Seller requires buyer information before any catalog order can be placed. Upon receiving the required buyer information, including verification of credit, the Seller assigns the Seller’s Buyer ID. This identification can then be used to receive price quotes on products offered by the Seller, or to place a catalog order. The benefit of a Buyer having provided information about itself prior to ordering is that the amount of information to be exchanged and the number of steps required to subsequently request a price quote or place a catalog order are reduced. This results in saving both the Buyer and the Seller processing time, reducing the cost of doing business.
Definition	[A set of simple sentences that state the actions performed as part of the business process.]
Participants	[List the type of partners involved in the Business Collaboration, e.g.]

	<p>manufacturer, supplier, customer.]</p> <p>Buyer</p> <p>Seller</p>
Preconditions	<p>[Preconditions are the rules for defining the conditions that must be true for the context that this process is conducted within. These rules are constraints that must be satisfied before instantiating or initializing the Business Collaboration thus ensuring that the proper context for the process has been established.]</p> <p>Valid Catalog on Hand</p> <p>No Valid Customer ID From This Seller</p>
Begins When	<p>[Identifies the event(s) from that start this Business Collaboration.]</p> <p>ID Request</p>
Ends When	<p>[List all the event(s) that causes normal completion of the Business Collaboration.]</p> <p>Send Response</p>
Exceptions	<p>[List all exception conditions (events) that will cause the Business Collaboration to terminate before its normal completion.]</p> <p>Response Date Exceeded</p>
Post-conditions	<p>[Post-conditions are the rules for defining the conditions that must be true for the localized context that exists after the Business Collaboration completes. These rules are constraints that must be satisfied after the business process thus ensuring that the proper update to context of the parent process has been occurred.]</p> <p>Buyer receives Customer ID or Rejection</p>
Realization	<p>What Business Collaboration is use to realize or instantiate this Business Collaboration Specification</p> <p>Obtain Customer ID Collaboration</p>
Business Requirements	<p>[The list of business requirements that apply to this Business Collaboration. The format of requirement definition is covered (as shown in Annex 4, Business process Specification Template, in the UMM).]</p>
Supporting Business Collaborations (including Business Transactions and Collaboration Protocols)	<p>[List the business transactions and business collaboration protocols that support (are part of) this business collaboration.]</p> <p>Obtain Customer ID</p>
Lifecycle(s)	<p>Identification of the Lifecycle(s) (Activity Model) that formalizes this Business Collaboration.</p> <p>Obtain Customer ID Lifecycle</p>

Metrics	[List of Metrics to be recorded for this business process/collaboration]
	Initiating: None
	Responding: Respond by Date

1299

1300

1301 *Business process metrics are operational or structural measurements that track how a*
 1302 *business process is performing over time. The Obtain Customer ID Business Collabora-*
 1303 *tion Specification (above) has a Respond by Date metric that needs that needs to be*
 1304 *elaborated in this next worksheet.*

1305

1306

Form: Business Process Metric	
Business Process Metric	[Provide a name for identification of a Metric or KPI. Metrics are the rules for defining the conditions for evaluating the localized context that exists during the Business Collaboration execution. They may define Key Performance Indicators (KPI) that reflect the achievement of particular business goals and/or objectives. These KPI's may also be the trigger certain events that are used as input to this and other processes.] Respond by Date
Description	[A plain text explanation of the purpose and behavior of the Business Process Metric] Date by which the Buyer expects a response to his Request for a Customer ID.
Metric	[Provide the business rule that defines this metric. These rules must be computational in format, e.g. OCL or other formal notation.] ID Request Date + 5 Business Days
Start Trigger	[Identifies the event that start the measurement of the metric. <u>This event may be computational in format, e.g. OCL or other formal notation.</u>] ID Request
End Trigger	[Identifies the event that stops the measurement of the metric. <u>This event may be computational in format. E.g.: OCL or other formal notation.</u>] Buyer receives Customer ID or Rejection

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1310 **Step 4 - Define Business Collaborations**

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1313 *An instance of this worksheet is linked to an instance of the Business Collaboration*
 1314 *Specification worksheet. New information (over and above that in the Business*
 1315 *Collaboration Specification worksheet) is requested for partner roles and business entities*
 1316 *associated with the business collaboration.*

1317 *In this example, there should be a Business Collaboration worksheet for Order From*
 1318 *Catalog, Ordering (as well as its six supporting business collaborations) and Settlement.*
 1319 *To keep this document a reasonable size, the Settlement collaboration will be omitted*
 1320 *because it is made up of just one business process, Debit Credit Card, which is simply a*
 1321 *business transaction. Debit Credit Card was discovered in the library and has already*
 1322 *been specified. The Order From Catalog, Ordering, and Obtain Customer ID business*
 1323 *collaborations will be modeled.*

1324

1325

Form: Business Collaboration	
Business Collaboration Name	[Provide a name for the Business Collaboration. Normally this should be the same as the BCS that it instantiates, however due to possible contextual constraints or business rules it may be necessary to differentiate this collaboration.] Order from Catalog Collaboration
Business Collaboration Specification	[What Business Collaboration Specification does this Business Collaboration realize/instantiate?] Order from Catalog Specification
Description	[A plain text explanation of the purpose and behavior of the Business Collaboration Specification] The Buyer orders goods mentioned in the catalogue. The Buyer may request a price quote (e.g. when the unit price amount of a product is not specified in the catalogue) before actually placing the order. In this case, the Seller first returns the price quote. In both cases, the Seller returns an order confirmation.
Participants	[List the type of partners involved in the Business Collaboration. E.g. manufacturer, supplier, customer] Buyer Seller Banker
Preconditions	From BRV Business Collaboration Specification Worksheet NA
Begins When	From BRV Business Collaboration Specification Worksheet NA

Ends When	From BRV Business Collaboration Specification Worksheet Product Shipped Seller is Paid								
Exceptions	From BRV Business Collaboration Specification Worksheet Seller Not Paid Product not Shipped								
Post-conditions	From BRV Business Collaboration Specification Worksheet <i>Buyer Notified of Shipment</i> <i>Shipment Notice Received by Buyer</i> Seller is Paid								
Partner Roles	[Identify the roles played by each partner.] <table border="1" data-bbox="597 762 1385 1045"> <thead> <tr> <th>Partner</th> <th>Roles</th> </tr> </thead> <tbody> <tr> <td>Buyer</td> <td>Initiator</td> </tr> <tr> <td>Seller</td> <td>Responder Initiator</td> </tr> <tr> <td>Banker</td> <td>Responder</td> </tr> </tbody> </table>	Partner	Roles	Buyer	Initiator	Seller	Responder Initiator	Banker	Responder
Partner	Roles								
Buyer	Initiator								
Seller	Responder Initiator								
Banker	Responder								
Business Entities	[Identify the Business Entities associated with this collaboration.]								
Supporting Business Transactions or Business Collaborations	[List the business transactions or business collaborations that support (are part of) this business collaboration.] Ordering Collaboration Settlement Collaboration								

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Form: Business Collaboration	
Business Collaboration Name	[Provide a name for the Business Collaboration. Normally this should be the same as the BCS that it instantiates, however due to possible contextual constraints or business rules it may be necessary to differentiate this collaboration.] Ordering Collaboration
Business Collaboration Specification	[What Business Collaboration Specification does this Business Collaboration realize/instantiate?] Ordering Specification
Description	[A plain text explanation of the purpose and behavior of the Business

	<p>Collaboration Specification]</p> <p>The Buyer orders goods mentioned in the catalogue. The Buyer may request a price quote (e.g. when the unit price amount of a product is not specified in the catalogue) before actually placing the order. In this case, the Seller first returns the price quote. In both cases, the Seller returns an order confirmation.</p>										
Participants	<p>[List the type of partners involved in the Business Collaboration. E.g. manufacturer, supplier, customer]</p> <p>Buyer</p> <p>Seller</p>										
Preconditions	<p>From BRV Business Collaboration Specification Worksheet</p> <p>NA</p>										
Begins When	<p>From BRV Business Collaboration Specification Worksheet</p> <p>NA</p>										
Ends When	<p>From BRV Business Collaboration Specification Worksheet</p> <p>Product Shipped</p>										
Exceptions	<p>From BRV Business Collaboration Specification Worksheet</p> <p>Product not Shipped</p>										
Post-conditions	<p>From BRV Business Collaboration Specification Worksheet</p> <p>Buyer Notified of Shipment</p> <p><i>Shipment Notice Received by Buyer</i></p>										
Partner Roles	<p>[Identify the roles played by each partner.]</p> <table border="1"> <thead> <tr> <th>Partner</th> <th>Roles</th> </tr> </thead> <tbody> <tr> <td>Buyer</td> <td>Initiator</td> </tr> <tr> <td>Seller</td> <td>Responder</td> </tr> <tr> <td></td> <td>Initiator</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>	Partner	Roles	Buyer	Initiator	Seller	Responder		Initiator		
Partner	Roles										
Buyer	Initiator										
Seller	Responder										
	Initiator										
Business Entities	<p>[Identify the Business Entities associated with this collaboration.]</p>										
Supporting Business Transactions or Business Collaborations	<p>[List the business transactions or business collaborations that support (are part of) this business collaboration.]</p> <p>Obtain Customer ID</p> <p>Obtain Product List</p> <p>Obtain Quote</p>										

	Place Order Obtain Order Status <i>Notify Buyer of Shipment</i>
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Form: Business Collaboration	
Business Collaboration Name	[Provide a name for the Business Collaboration. Normally this should be the same as the BCS that it instantiates, however due to possible contextual constraints or business rules it may be necessary to differentiate this collaboration.] Obtain Customer ID Collaboration
Business Collaboration Specification	[What Business Collaboration Specification does this Business Collaboration realize/instantiate?] Obtain Customer ID Specification
Description	[A plain text explanation of the purpose and behavior of the Business Collaboration Specification] A Buyer finds one or more items in a Catalog that the Buyer needs. However, since the Buyer has never conducted business with the Seller before, the Seller requires buyer information before any catalog order can be placed. Upon receiving the required buyer information, including verification of credit, the Seller assigns the Seller's Buyer ID. This identification can then be used to receive price quotes on products offered by the Seller, or to place a catalog order. The benefit of a Buyer having provided information about itself prior to ordering is that the amount of information to be exchanged and the number of steps required to subsequently request a price quote or place a catalog order are reduced. This results in saving both the Buyer and the Seller processing time, reducing the cost of doing business.
Participants	[List the type of partners involved in the Business Collaboration. E.g. manufacturer, supplier, customer] Buyer Seller
Preconditions	From BRV Business Collaboration Specification Worksheet Valid Catalog on Hand No Valid Customer ID From This Seller
Begins When	From BRV Business Collaboration Specification Worksheet ID Request

Ends When	From BRV Business Collaboration Specification Worksheet Send Response						
Exceptions	From BRV Business Collaboration Specification Worksheet Response Date Exceeded						
Post-conditions	From BRV Business Collaboration Specification Worksheet Buyer receives Customer ID or Rejection						
Partner Roles	[Identify the roles played by each partner.] <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #cccccc;"> <th style="width: 50%;">Partner</th> <th style="width: 50%;">Roles</th> </tr> </thead> <tbody> <tr> <td>Buyer</td> <td>Initiator</td> </tr> <tr> <td>Seller</td> <td>Responder</td> </tr> </tbody> </table>	Partner	Roles	Buyer	Initiator	Seller	Responder
Partner	Roles						
Buyer	Initiator						
Seller	Responder						
Business Entities	[Identify the Business Entities associated with this collaboration.] Customer Information						
Supporting Business Transactions or Business Collaborations	[List the business transactions or business collaborations that support (are part of) this business collaboration.] NA						

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1335 *A business process lifecycle is a set of conditions that can be identified for a business*
 1336 *process for which a business collaboration protocol can be specified. Such conditions*
 1337 *are Begins When, Ends When, intermediate points that can be monitored, and points*
 1338 *where exception processing could begin that result in an outcome other than normal*
 1339 *completion. This lifecycle was originally identified in the Business Process worksheet*
 1340 *(BRV Step 1).*

1341

1342 *Again, to keep this document a manageable size, only the lifecycle for the overall Order*
 1343 *From Catalog business collaboration will be shown.*

1344

1345

Form: Business Process/Collaboration Lifecycle (Activity Model)	
Process Lifecycle Name	[Provide a name for this Lifecycle. This name is used to identify the lifecycle that a Business Process or Business Collaboration is formally defined by.] Order from Catalog Lifecycle
Description	[A plain text explanation of the purpose and behavior of the Lifecycle.]

	<p>The Buyer orders goods mentioned in the catalogue. The Buyer may request a price quote (e.g. when the unit price amount of a product is not specified in the catalogue) before actually placing the order. In this case, the Seller first returns the price quote. In both cases, the Seller returns an order confirmation.</p>
<p>Preconditions</p>	<p>[Preconditions are the rules for defining the conditions that must be true for the context that this process lifecycle is executed within. These rules are constraints that must be satisfied before instantiating or initializing the process lifecycle thus ensuring that the proper context for the process has been established.</p> <p>These conditions must be a subset of the preconditions defined by the process that this lifecycle is defining and be computational in format. E.g.: OCL or other formal notation.]</p> <p>None</p>
<p>Begins When</p>	<p>[Identifies the event(s) that start this process lifecycle. For any lifecycle there is only one starting point, known as a start state. This list of events is the only one which will instantiate the lifecycle and cause it to enter into a start state.</p> <p>These event(s) must be a subset of the event(s) defined by the process that this lifecycle is defining and be computational in format. E.g.: OCL or other formal notation.]</p> <p><u>NA</u></p>
<p>States</p>	<p>The following section defines the states or conditions that the process lifecycle can be in.</p>
	<p>Start State</p> <p>The Start State is a pseudo state in which the initialization and instantiation of lifecycle artifacts and context occurs.]</p>
	<p>State Transition Table (Start State)</p> <p>Event: [Identifies the event(s) that start this process lifecycle. For any lifecycle there is only one starting point, known as a start state. This list of events is the only one which will instantiate the lifecycle and cause it to enter into a condition or state as determined by the processing of a defined event.]</p> <p>These event(s) must be a subset of the event(s) defined by the process that this lifecycle is defining and <i>may</i> be computational in format. E.g.: OCL or other formal notation.]</p> <p>Source: [For each event listed above identify the source of the event as defined by the current lifecycle context].</p> <p>Rule: [For each event, define the constraint or guard that indicates the resultant condition or state. If there are multiple states for a given event there should be a rule for each. This rule should be computational in format. E.g.: OCL or other</p>

	<p>formal notation.].</p> <p>Transition to: [For each event identify the resulting condition (state) of the lifecycle. If a particular event can result in more than one condition or state define the rule that indicates which condition will be the actual resultant.].</p> <table border="1"> <thead> <tr> <th>Event</th> <th>Source</th> <th>Rule</th> <th>Transition to</th> </tr> </thead> <tbody> <tr> <td>START</td> <td>Buyer</td> <td>No Valid Catalog On-Hand</td> <td>Obtain Product List</td> </tr> <tr> <td>START</td> <td>Buyer</td> <td>Valid Catalog On-Hand && No Valid Customer ID From This Seller</td> <td>Obtain Customer ID</td> </tr> <tr> <td>START</td> <td>Buyer</td> <td>Valid Catalog On-Hand && Valid Customer ID From This Seller && Quote Required</td> <td>Obtain Quote</td> </tr> <tr> <td>START</td> <td>Buyer</td> <td>Valid Catalog On-Hand && Valid Customer ID From This Seller && No Quote Required</td> <td>Place Order</td> </tr> </tbody> </table>	Event	Source	Rule	Transition to	START	Buyer	No Valid Catalog On-Hand	Obtain Product List	START	Buyer	Valid Catalog On-Hand && No Valid Customer ID From This Seller	Obtain Customer ID	START	Buyer	Valid Catalog On-Hand && Valid Customer ID From This Seller && Quote Required	Obtain Quote	START	Buyer	Valid Catalog On-Hand && Valid Customer ID From This Seller && No Quote Required	Place Order
Event	Source	Rule	Transition to																		
START	Buyer	No Valid Catalog On-Hand	Obtain Product List																		
START	Buyer	Valid Catalog On-Hand && No Valid Customer ID From This Seller	Obtain Customer ID																		
START	Buyer	Valid Catalog On-Hand && Valid Customer ID From This Seller && Quote Required	Obtain Quote																		
START	Buyer	Valid Catalog On-Hand && Valid Customer ID From This Seller && No Quote Required	Place Order																		

For each state or condition of the lifecycle, repeat the following entries.

State	<p>Name: [Identify a state or condition of this lifecycle.]</p> <p>Description: [Provide a textual description of this condition/state]</p> <p>Definition: [Definitions are the rules for defining the localized conditions that must be true within the context of this process lifecycle that asserts that this condition has been achieved. If these rules are not true for this condition, then an invalid or unknown state has been achieved.</p> <p>These rules must be computational in format. E.g.: OCL or other formal notation.]</p> <p>Actions: [Identify the set of actions that may be performed while in this state. Define the constraint (rule) that controls the performance of each action. In the case where no constraint is defined, the action is always performed.]</p> <p>Name: Obtain Product List</p> <p>Description: Requests a Product Catalog</p> <p>Definition: NA</p> <p>Actions: Obtain Product List</p>
--------------	---

Transitions	<table border="1"> <thead> <tr> <th>Event</th> <th>Source</th> <th>Rule</th> <th>Transition to</th> </tr> </thead> <tbody> <tr> <td>Request List</td> <td>Buyer</td> <td>No Valid</td> <td>Obtain</td> </tr> </tbody> </table>	Event	Source	Rule	Transition to	Request List	Buyer	No Valid	Obtain
Event	Source	Rule	Transition to						
Request List	Buyer	No Valid	Obtain						

			Customer ID From This Seller	Customer ID
	Request List	Buyer	Valid Customer ID From This Seller && Quote Required	Obtain Quote
	Request List	Buyer	Valid Customer ID From This Seller && No Quote Required	Place Order
State	<p>Name: Obtain Customer ID</p> <p>Description: Request for a Customer ID for quotes and purchases</p> <p>Definition: NA</p> <p>Actions: NA</p>			
Transitions	Event	Source	Rule	Transition to
	ID Request	Buyer	Quote Required	Obtain Quote
	ID Request	Buyer	No Quote Required	Place Order
State	<p>Name: Obtain Quote</p> <p>Description: Obtains a Price Quote for subsequent order placement.</p> <p>Definition: NA</p> <p>Actions: Obtain Quote</p>			
Transitions	Event	Source	Rule	Transition to
	Request Quote	Buyer	Quote Accepted	Place Order
	Request Quote	Buyer	Quote Rejected && Re-quote Request	Obtain Quote
	Request Quote	Buyer	Quote Rejected	Exit with no Order

State	<p>Name: PlaceOrder</p> <p>Description: Places an Order for one or more products.</p> <p>Definition: NA</p> <p>Actions: PlaceOrder</p>			
Transitions	Event	Source	Rule	Transition to
	Send Order	Buyer	Shipment Notice Not Received	Obtain Order Status
	Accept Order	Seller	Product Shipped	<i>Debit Credit Card & Notify Buyer of Shipment</i>
State	<p>Name: ObtainOrderStatus</p> <p>Description: Determine the Order status.</p> <p>Definition: NA</p> <p>Actions: Check Order Status</p>			
Transitions	Event	Source	Rule	Transition to
	Check Order Status	Buyer	Receive Shipment Notification	END
	Check Order Status	Buyer	No Shipment Notice Received && Need Order Status	Obtain Order Status
State	<p>Name: DebitCreditCard</p> <p>Description: Debit the Buyer's credit card.</p> <p>Definition: NA</p> <p>Actions: Debit Credit Card</p>			
Transitions	Event	Source	Rule	Transition to
	Get Authorization from Bank	Seller	Seller is Paid	END
State	<p>Name: <i>Notify Buyer of Shipment</i></p> <p>Description: <i>Issue shipping order.</i></p> <p>Definition: <i>NA</i></p>			

	Actions: <i>Ship Product</i> <i>Shipment Notice Sent</i>			
Transitions	Event	Source	Rule	Transition to
	<i>Send Shipment Notice</i>	<i>Seller</i>	<i>Shipment Notice Sent</i>	<i>END</i>
Post-conditions	<p>[Post-conditions are the rules for defining the conditions that must be true for the localized context that exists after the process lifecycle completes. These rules are constraints that must be satisfied after the lifecycle thus ensuring that the proper update to context of the parent process has occurred.</p> <p>These constraint(s) must be a subset of the constraint(s) defined by the process that this lifecycle is defining and be computational in format. E.g.: OCL or other formal notation.]</p> <p><i>Buyer Notified of Shipment</i></p> <p><i>Seller is Paid</i></p> <p><i>Shipment Notice Received by Buyer</i></p>			

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1350 *By using the OrderFromCatalog Business Process Lifecycle Worksheet it was also*
 1351 *discovered that the Seller needs to notify the Buyer that the product has been shipped.*
 1352 *This is shown in the following Activity Model for the Order From Catalog collaboration.*

1353 *At this point one would iterate again through the BRV and add the Notify Buyer of*
 1354 *Shipment business process and adjust the Order From Catalog and Ordering collabora-*
 1355 *tions accordingly. The changes that should be made to these collaborations are italicized*
 1356 *in 'California Navel' orange.*

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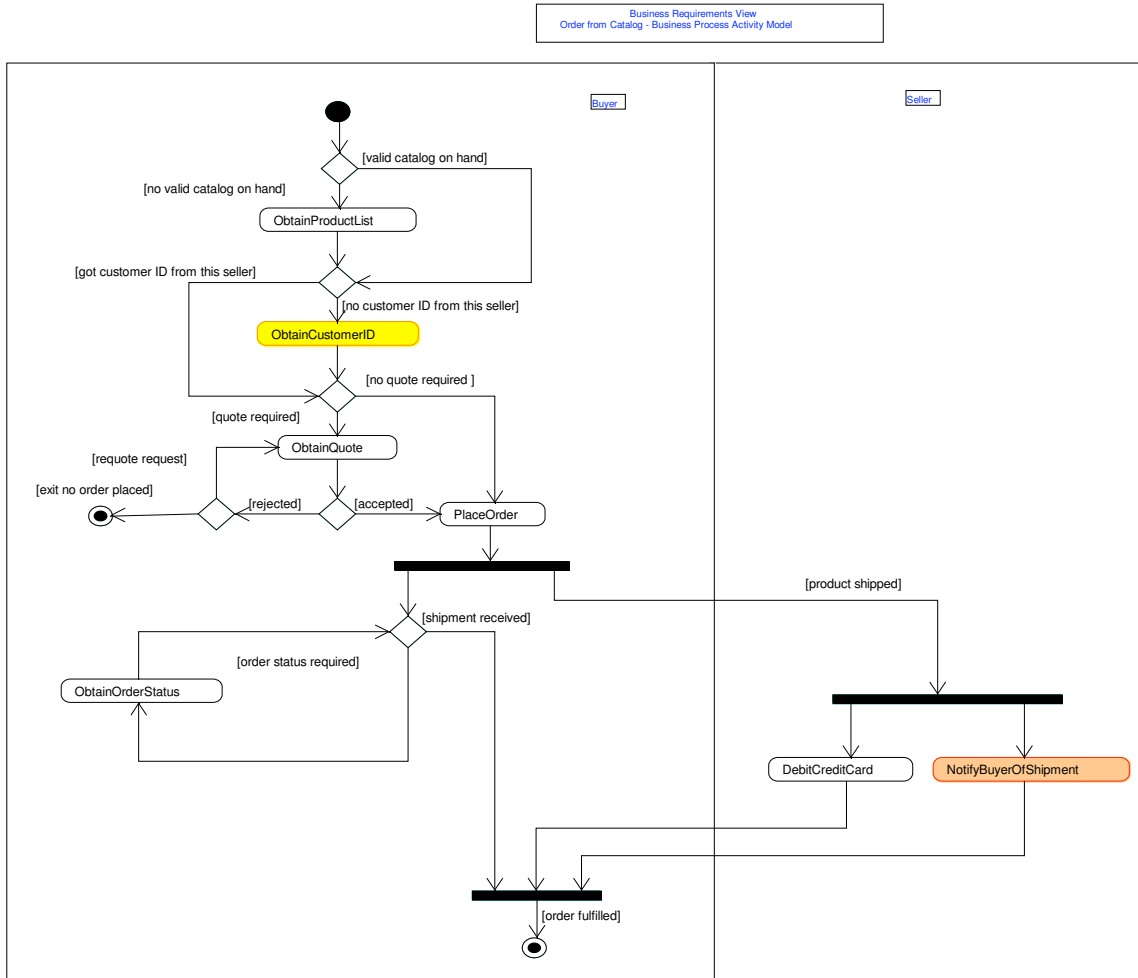
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Business Process Activity Model



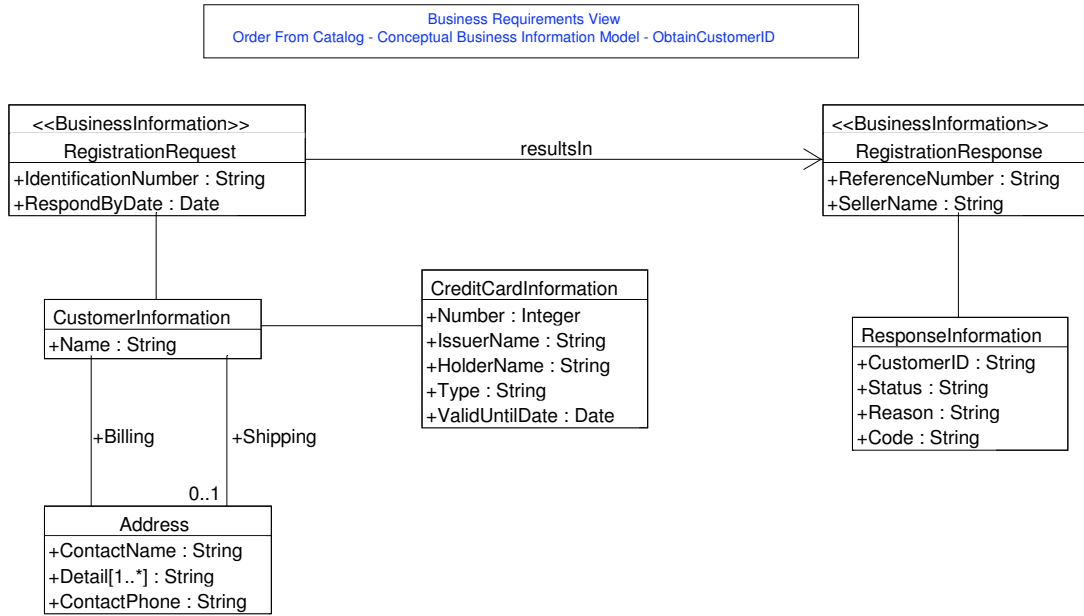
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Conceptual Business Information Model

1368 *The supporting transactions/business collaborations from the Order from Catalog*
 1369 *Collaboration worksheet and information captured in the Order from Catalog Lifecycle*
 1370 *worksheet identify the lifecycle states and conditions required to transition from one*
 1371 *business process state to another. Generally the conditions that are required to complete*
 1372 *a supporting transaction/business collaboration and to transition to another state are*
 1373 *successful exchanges of information between the trading partners. Looking in more detail*
 1374 *at the Obtain Customer ID Collaboration worksheet, exchange of an ID request and*
 1375 *response are identified as essential to the collaboration. Also the Customer Information*
 1376 *business entity is identified as being affected in this collaboration. Thus, one would*
 1377 *assume that information about the customer would be included in the ID request. The*
 1378 *following conceptual business information model captures the business information and*
 1379 *associated information entities that would be envisioned at this point as being included in*
 1380 *the collaboration request and response. It also reflects business information require-*
 1381 *ments that would have been gathered from the business domain experts as part of*
 1382 *Business Requirements of the Business Process worksheet.*

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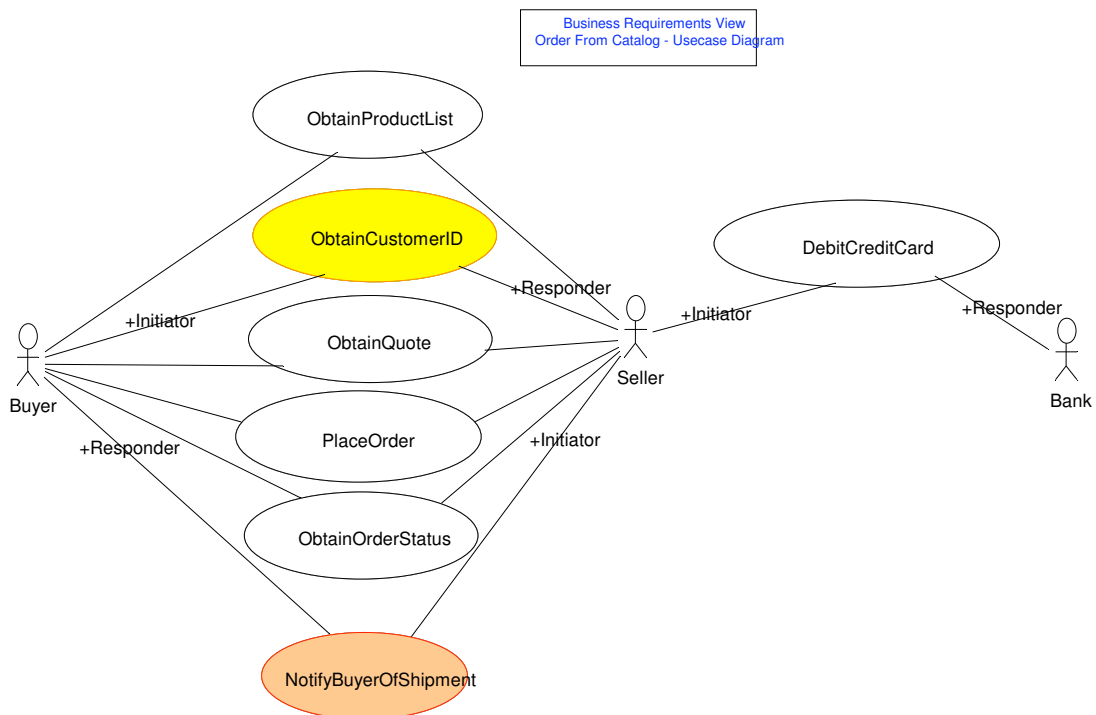
The Business Process Use Case now reflects the two new business processes.

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Business Process Use Case

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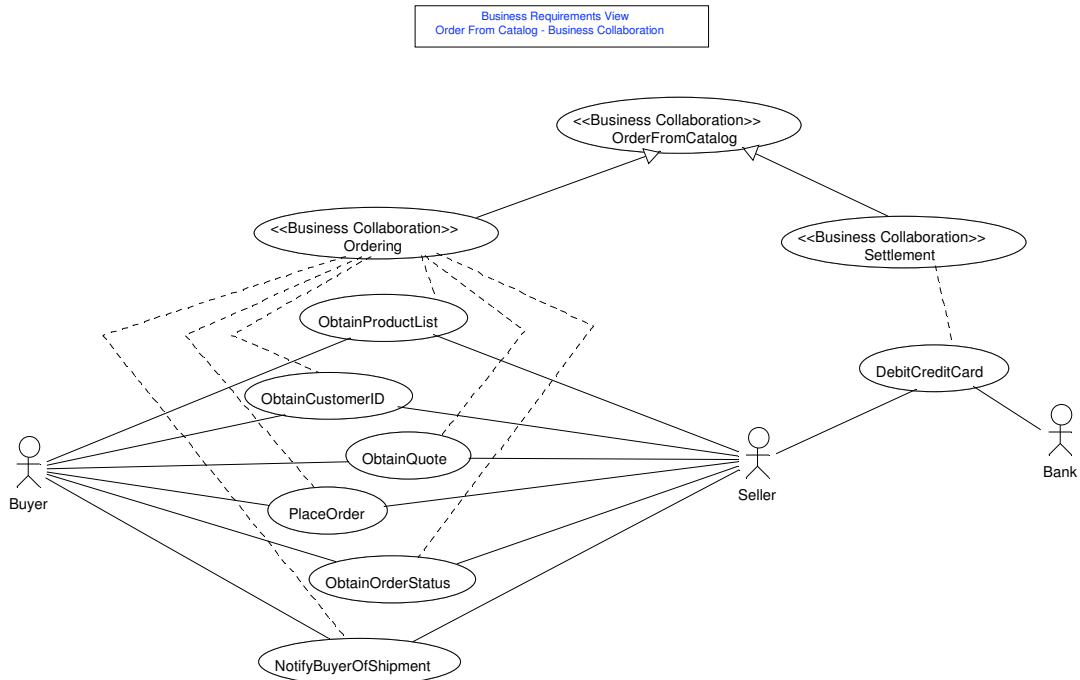
1397 *This Business Collaboration Use Case diagram illustrates that Order From Catalog has*
 1398 *two collaborations – Ordering and Settlement – that use the two new business processes*
 1399 *as well as the existing business processes.*

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1402 **Business Collaboration Use Case**

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1408 **Step 5 – Identify and Describe Business Entities**

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1411 *Business Entities are the subject of business collaboration activities. It's a real-world*
 1412 *thing, concept, process or event having business significance that is shared among two or*
 1413 *more trading partners, and which exists in two or more states of at least one lifecycle.*

1414 *In the first of the next two worksheets, the business significance, attributes, and behavior*
 1415 *of the Customer Information business entity are identified and described. The lifecycle of*
 1416 *the business entity is associated with it's behavior – Obtain Customer ID.*

1417 *The second worksheet goes into more detail by describing the entity's lifecycle. To avoid*
 1418 *confusion, the lifecycle name Registration Lifecycle was chosen rather than Obtain*
 1419 *Customer ID Lifecycle. The latter already exists as a business process lifecycle name.*

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Form: Business Entity			
Business Entity Name:	[Provide the name that this Business Entity is identified by.] Customer Information		
Description:	[A plain text explanation of the purpose and behavior of the Business Entity.] Information about a prospective Buyer that is required by the Seller in order for the Seller to register the Buyer and assign a Buyer ID		
Business Entity Characteristics	Define the set of characteristics or attributes that define the structural aspects of the Business Entities.		
	Name	Type	Constraints
	Party	Business Object	Mandatory
	Billing Address	Business Object	Mandatory
	Shipping Address	Business Object	Optional
	Account	Business Object	Mandatory
Business Entity Behavior	Define the set of operations that affect the behavioral aspects of the Business Entity.		
Name:	[Enter the name of the operation.] Obtain Customer ID		
Lifecycle:	[Enter the name of the lifecycle that defines this behavior.] Registration Lifecycle		

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Form: Business Entity Lifecycle	
Business Entity Lifecycle Name	[Name the State Model. Below, in the States section of this worksheet, you can mention all of the state values and their information requirements] Registration Lifecycle
Business Entity Name	[Provide a name for the Business Entity] Customer Information

Description	<p>[A plain text explanation of the purpose and behavior of the lifecycle defined here.]</p> <p>This lifecycle supports the creation of Customer Information by a Buyer and acceptance of the Customer Information by a Seller for the purpose of registering the Buyer with the Seller.</p>								
States	<p>The following section defines the states or condition that the lifecycle can occur.</p>								
	<p>Start State</p> <p>The Start State is a pseudo state in which the initialization and instantiation of lifecycle artifacts and context occurs.</p>								
	<p>Transitions (<u>Start State</u>)</p> <p>Event: [Identifies the event(s) from the start state of this lifecycle. For any lifecycle there is only one starting point, known as the start state. This list of events are the only ones that would instantiate the lifecycle and cause the business entity to enter into a condition or state as determined by the processing of the defined event.</p> <p>These event(s) may be computational in format. E.g.: OCL or other formal notation.]</p> <p>Source: [For each event listed above identify the source of the event as defined by the current lifecycle context].</p> <p>Rule: [For each event, define the constraint or guard that indicates the resultant condition or state. If there are multiple states for a given event there should be a rule for each. This rule should be computational in format. E.g.: OCL or other formal notation.].</p> <p>Transition to: [For each event identify the resulting condition (state) of the lifecycle. If a particular event can result in more than one condition or state define the rule that indicates which condition will be the actual resultant.].</p> <table border="1" data-bbox="602 1293 1370 1566"> <thead> <tr> <th>Event</th> <th>Source</th> <th>Rule</th> <th>Transition to</th> </tr> </thead> <tbody> <tr> <td>Buyer determines to initiate a relationship with the Seller</td> <td>Buyer</td> <td>Buyer assembles Customer Information such that it contains required business entity characteristics</td> <td>Pending</td> </tr> </tbody> </table>	Event	Source	Rule	Transition to	Buyer determines to initiate a relationship with the Seller	Buyer	Buyer assembles Customer Information such that it contains required business entity characteristics	Pending
Event	Source	Rule	Transition to						
Buyer determines to initiate a relationship with the Seller	Buyer	Buyer assembles Customer Information such that it contains required business entity characteristics	Pending						
<p>For each state or condition of the lifecycle, repeat the following entries.</p>									
	<p>State</p> <p>Name: [Identify a state or condition of this lifecycle.]</p> <p>Description: [Provide a textual description of this condition/state]</p> <p>Definition: [Definitions are the rules for defining the localized conditions that must be true within the context of this lifecycle that assert that this condition has been achieved. If these rules are not true for this condition, then an invalid or unknown state has been</p>								

	<p>achieved.</p> <p>These rules must be computational in format. E.g.: OCL or other formal notation.]</p> <p>Actions: [Identify the set of actions that may be performed while in this state. Defined the constraint that controls the performance of each action. In the case where no constraint is defined, the action is always performed.]</p> <p>Name: Pending</p> <p>Description: Customer Information is assembled as an information entity, ready for submission as a registration request to the Seller</p> <p>Definition: All required characteristics of Customer Information are assembled</p> <p>Actions: Customer Information may be submitted as a registration request to the Seller when all required characteristics are assembled and Customer Information Status = Pending</p>												
<p>Transitions</p>	<p>[For each event listed above identify the resulting condition (state) of the lifecycle. If a particular event can result in more than one condition or state, define the constraint (rule), that indicates which condition would be the actual resultant. This constraint should be <u>computational in format. E.g.: OCL or other formal notation.</u>]</p> <table border="1" data-bbox="602 1003 1365 1276"> <thead> <tr> <th>Event</th> <th>Source</th> <th>Rule</th> <th>Transition to</th> </tr> </thead> <tbody> <tr> <td>Registration request has been sent to the Seller</td> <td>Buyer</td> <td>Buyer has confirmation from messaging service that the registration request has been sent to the Seller</td> <td>Tendered</td> </tr> </tbody> </table>	Event	Source	Rule	Transition to	Registration request has been sent to the Seller	Buyer	Buyer has confirmation from messaging service that the registration request has been sent to the Seller	Tendered				
Event	Source	Rule	Transition to										
Registration request has been sent to the Seller	Buyer	Buyer has confirmation from messaging service that the registration request has been sent to the Seller	Tendered										
<p>State:</p>	<p>Name: Tendered</p> <p>Description: Registration request has been submitted to the Seller</p> <p>Definition: Buyer has confirmation from messaging service that the registration request has been sent to the Seller</p> <p>Actions: Registration request may be received by the Seller when Customer Information Status = Tendered. Seller proceeds to evaluate the registration request</p>												
<p>Transitions</p>	<table border="1" data-bbox="602 1608 1365 1892"> <thead> <tr> <th>Event</th> <th>Source</th> <th>Rule</th> <th>Transition to</th> </tr> </thead> <tbody> <tr> <td>Registration Request accepted by the Seller</td> <td>Seller</td> <td>Registration Request Is complete and valid and credit check is positive</td> <td>Accepted</td> </tr> <tr> <td>Registration Request</td> <td>Seller</td> <td>Registration Request</td> <td>NonAc-</td> </tr> </tbody> </table>	Event	Source	Rule	Transition to	Registration Request accepted by the Seller	Seller	Registration Request Is complete and valid and credit check is positive	Accepted	Registration Request	Seller	Registration Request	NonAc-
Event	Source	Rule	Transition to										
Registration Request accepted by the Seller	Seller	Registration Request Is complete and valid and credit check is positive	Accepted										
Registration Request	Seller	Registration Request	NonAc-										

	rejected by the Seller		fails for some reason	cepted
State:	<p>Name: Accepted</p> <p>Description: Buyer Information is complete, credit check is positive, and Seller's Buyer ID is assigned</p> <p>Definition: Buyer Information is complete (all required characteristics are present) and validated, and credit check with the bank of Buyer's credit is positive. Seller's Buyer ID assigned = yes</p> <p>Actions: Registration Response may be received by the Buyer when Customer Information Status = Accepted</p>			
Transitions	Event	Source	Rule	Transition to
	Buyer receives Registration Response from the Seller	Seller	Buyer receives Registration Response from the Seller before timeout	Confirmed
	Timeout on Registration Request	Seller	Buyer receives no response on Registration Request by Respond by Date	Start
State	<p>Name: NotAccepted</p> <p>Description: Buyer Information is incomplete, or credit check is negative, Seller's Buyer ID is not assigned.</p> <p>Definition: Buyer Information is incomplete (required characteristics are missing or can not be validated,. Or, credit check with the bank of Buyer's credit is negative. Seller's Buyer ID assigned = no.</p> <p>Actions: Registration Response may be received by the Buyer when Customer Information Status = NotAccepted</p>			
Transitions:	Event	Source	Rule	Transition to
	Buyer receives Registration Response from the Seller	Seller	Buyer receives Registration Response from the Seller before timeout	Rejected
	Timeout on Registration Request	Seller	Buyer receives no response on Registration Request by Respond by Date	Start

<p>State:</p>	<p>Name: Confirmed</p> <p>Description: Buyer receives a positive Registration Response from the Seller</p> <p>Definition: A positive Registration Response is received, including an assigned Seller's Customer ID</p> <p>Action: Buyer receives a Registration Response with Customer Information Status = Accepted and an assigned Seller's Customer ID</p>											
<p>Transitions</p>	<table border="1"> <thead> <tr> <th>Event</th> <th>Source</th> <th>Rule</th> <th>Transition to</th> </tr> </thead> <tbody> <tr> <td>Buyer receives a Registration Response with Customer Information Status = Accepted and an assigned Seller's Customer ID</td> <td>Seller</td> <td>Registration Response is positive</td> <td>Success end</td> </tr> </tbody> </table>	Event	Source	Rule	Transition to	Buyer receives a Registration Response with Customer Information Status = Accepted and an assigned Seller's Customer ID	Seller	Registration Response is positive	Success end			
Event	Source	Rule	Transition to									
Buyer receives a Registration Response with Customer Information Status = Accepted and an assigned Seller's Customer ID	Seller	Registration Response is positive	Success end									
<p>State:</p>	<p>Name: Rejected</p> <p>Description: Buyer receives a negative Registration Response from the Seller</p> <p>Definition: A negative Registration Response is received with no assigned Seller's Customer ID</p> <p>Action: Buyer receives a Registration Response with Customer Information Status = NotAccepted and no Seller's Customer ID</p>											
<p>Transitions</p>	<table border="1"> <thead> <tr> <th>Event</th> <th>Source</th> <th>Rule</th> <th>Transition to</th> </tr> </thead> <tbody> <tr> <td>Buyer receives a Registration Response with Customer Information Status = NotAccepted and no Seller's Customer ID</td> <td>Seller</td> <td>Registration response is negative</td> <td>Success end</td> </tr> </tbody> </table>	Event	Source	Rule	Transition to	Buyer receives a Registration Response with Customer Information Status = NotAccepted and no Seller's Customer ID	Seller	Registration response is negative	Success end			
Event	Source	Rule	Transition to									
Buyer receives a Registration Response with Customer Information Status = NotAccepted and no Seller's Customer ID	Seller	Registration response is negative	Success end									
<p>Post-conditions</p>	<p>[Post-conditions are the rules for defining the conditions that must be</p>											

	<p>true for the localized context that exists after the process lifecycle completes. These rules are constraints that must be satisfied after the lifecycle, thus ensuring that the proper update to context of the parent process has occurred.</p> <p>These constraint(s) must be a subset of the constraint(s) defined by the process that this lifecycle is defining and be computational in format. E.g.: OCL or other formal notation.]</p> <p>If the Registration Response is positive, i.e., Seller’s Buyer ID has been assigned) Buyer may proceed to ObtainQuote or PlaceOrder. If the Registration Response is negative, or if a Registration Response is not received by the Respond by Date, the Buyer may not proceed to ObtainQuote or PlaceOrder.</p>
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BTV Example Worksheets

Step 1 - Define a Business Collaboration Protocol

The following worksheet specifies the choreography of the order from catalog business collaboration at the BTV level. The states of the collaboration are described through each business transaction activity in terms of recognized events, state transitions, and conditions, or rules, that must be satisfied for state transitions for occur. The object flow graph that follows illustrates the contents of this worksheet for the Obtain Customer ID business transaction activity.

Form: Business Collaboration Protocol (Activity Model)	
Business Collaboration Protocol	[Provide a name for the Business Collaboration Protocol.] Order from Catalog
Description	[A plain text explanation of the purpose and behavior of the Business Collaboration Protocol] The Buyer orders goods mentioned in the catalogue. The Buyer may request a price quote (e.g. when the unit price amount of a product is not specified in the catalogue) before actually placing the order. In this case, the Seller first returns the price quote. In both cases, the Seller returns an order confirmation.
Preconditions	[Preconditions are the rules for defining the conditions that must be true for the context that this BCP is executed within. These rules are constraints that must be satisfied before instantiating or initializing the BCP thus ensuring that the proper context for the BCP has been established. These conditions must be computational in format. E.g.: OCL or

	<p>other formal notation.]</p> <p>none</p>
Begins When	<p>[Identifies the event(s) from that start this BCP. For any BCP there is only one starting point, known as a start state. This list of events are the only ones which will instantiate the BCP and cause it to enter into a condition or state as determined by the processing of the defined event.</p> <p>These event(s) may be computational in format. E.g.: OCL or other formal notation.]</p> <p>Buyer indicates a need for a product</p>
Business Transaction Activities	<p>The following section defines the states that the Business Collaboration Protocol can occur. These states define which Business Transactions are performed.</p>
Start State	<p>The Start State is a pseudo state in which the initialization and instantiation of Business Collaboration Protocol artifacts and context occurs.]</p>
<u>Recognized Events (Start State)</u>	<p>[Identifies the event(s) from that start this Business Collaboration Protocol. For any Business Collaboration Protocol there is only one starting point, known as a start state. This list of events are the only ones which will instantiate the BCP and cause it to enter into a condition or state as determined by the processing of a defined event.</p> <p>These event(s) may be computational in format. E.g.: OCL or other formal notation.]</p> <p>Start with no valid catalog on-hand</p> <p>Start with valid catalog on-hand and no valid Seller’s Customer ID</p> <p>Start with valid catalog on-hand and valid Seller’s Customer ID and quote required</p> <p>Start with valid catalog on-hand and valid Seller’s Customer ID and no quote required.</p>
<u>Transitions (Start State)</u>	<p>[For each event listed above identify the resulting Business Transaction Activity of the Business Collaboration Protocol. If a particular event can result in more than one Business Transaction Activity, define the constraint, which indicates which condition will be the actual resultant.</p> <p>If more than one constraint qualifies for a particular event, then the Business Collaboration Protocol process path will fork.</p> <p>This constraint should <u>be computational in format. E.g.: OCL or other formal notation.</u></p> <p>Start with no valid catalog on-hand – Obtain Product List</p> <p>Start with valid catalog on-hand and no valid Seller’s Customer</p>

	ID – Obtain Customer ID Start with valid catalog on-hand and valid Seller’s Customer ID and quote required – Obtain Quote Start with valid catalog on-hand and valid Seller’s Customer ID and no quote required – Place Order			
State:	Obtain Product List			
Transitions	Event	Source	Rule	Transition to
	Request List	Buyer	no valid Seller’s Customer ID	Obtain Customer ID
	Request List	Buyer	valid Seller’s Customer ID on-hand and quote required	Obtain Quote
	Request List	Buyer	valid Seller’s Customer ID on-hand and no quote required	Place Order
State	Obtain Customer ID			
Transitions	Event	Source	Rule	Transition to
	ID Request	Buyer	Quote Required	Obtain Quote
	ID Request	Buyer	No Quote Required	Place Order
State	Obtain Quote			
Transitions	Event	Source	Rule	Transition to
	Request Quote	Buyer	Quote Accepted	Place Order
	Request Quote	Buyer	Quote Rejected && Re-quote Request	Obtain Quote
	Request Quote	Buyer	Quote Rejected	Exit with no Order
State	Place Order			
Transitions	Event	Source	Rule	Transition to
	Buyer	Buyer	Seller	END

	received Product		commitment fulfilled	
	Buyer Check for Shipment Notice	Buyer	Shipment Notice Not Received	Obtain Order Status
	Seller Accepts Order	Seller	Product Shipped	Debit Credit Card && Notify Buyer of Shipment
State	Obtain Order Status			
Recognized events	Buyer received Product Product not received by Buyer and Order Status needed			
Transitions	Buyer received Product - Buyer End (Seller commitment fulfilled) Product not received by Buyer and Order Status needed – Obtain Order Status			
	Event	Source	Rule	Transition to
	Check Order Status	Buyer	Receive Shipment Notification	END
	Check Order Status	Buyer	No Shipment Notice Received && Need Order Status	Obtain Order Status
State	Debit Credit Card			
Transitions	Event	Source	Rule	Transition to
	Get Authorization from Bank	Seller	Seller is Paid	END
State	Notify Buyer of Shipment			
Recognized events	Messaging service acknowledgment that shipment notice sent			
Transitions	Event	Source	Rule	Transition to
	Send Shipment Notice	Seller	Shipment Notice Sent	END
For each Business Transaction Activity of the lifecycle, repeat the following entries.				

<p><i>Business Transaction Activity</i></p>	<p>Name: [Identify a Business Transaction Activity of this Business Collaboration Protocol.]</p> <p>Obtain Product List</p> <p>Description: [Provide a textual description of this Business Transaction Activity]</p> <p>To order from a Seller’s catalogue the Buyer determines whether he has a current catalogue of the Seller or not. If not, the Buyer sends a request for the catalogue and the Seller returns the electronic version of the catalogue.</p> <p>Definition: [Definitions are the rules for defining the localized conditions that must be true within the context of this Business Collaboration Protocol that asserts that this condition has been achieved. If these rules are not true for this condition, then an invalid or unknown state has been achieved.</p> <p>These rules must be computational in format. E.g.: OCL or other formal notation.]</p> <p>No valid catalog on-hand</p> <p>Action: [Identify the Business Transaction that is performed while in this Business Transaction Activity.]</p> <p>Obtain Product List</p>
<p><u>Recognized Events</u></p>	<p><u>[Identifies the event(s) that are recognized by the Business Transaction Activity.]</u></p> <p><u>These event(s) may be computational in format. E.g.: OCL or other formal notation.]</u></p> <p>Seller returns electronic version of the catalog and no valid Seller’s Customer ID</p> <p>Seller returns electronic version of the catalog and valid Seller’s Customer ID, and require a Quote</p> <p>Seller returns electronic version of the catalog and valid Seller’s Customer ID, and do not require a Quote</p>

<p>Recognized Events</p>	<p>Seller assigned a Seller’s Customer ID and require a Quote Seller assigned a Seller’s Customer ID and do not require a Quote</p>	
<p>Transitions</p>	<p>Event: Seller assigned a Seller’s Customer ID and require a Quote Seller assigned a Seller’s Customer ID and do not require a Quote</p>	<p>Obtain Quote Place Order</p>
	<p>Associated Business Entity: Customer ID</p>	<p>Customer ID transitions from Request Tendered to Assigned or Request Rejected</p>
<p>Business Transaction Activity</p>	<p>Name: Obtain Quote Description: Before ordering, the Buyer verifies whether the current price of the product is available. If not, the Buyer will request a price quote and the Seller returns the price quote. Note that only a registered Buyer can request a price quote. Definition: Buyer requires a Quote before ordering and has a valid Seller’s Customer ID Action: Obtain Quote</p>	
<p>Recognized Events:</p>	<p>Seller provides a Price Quote to the Buyer Seller rejects Buyer’s request for a Price Quote and Buyer re-requests a Price Quote Seller rejects Buyer’s request for a Price Quote and Buyer declines to order</p>	
<p>Transitions</p>	<p>Event: Seller provides a Price Quote to the Buyer Seller rejects Buyer’s request for a Price Quote and Buyer re-requests a Price Quote Seller rejects Buyer’s request for a Price Quote and Buyer declines to order</p>	<p>Place Order Obtain Quote Exit with no order</p>

	Associated Business Entity Price Quote	Price Quote transitions from Request Tendered to Received or Request Rejected
Business Transaction Activity	Name: Place Order Description: If the Buyer wants to order the product(s) (according either to the already known price information or to the requested price quote) he sends an order to the Seller. The Seller returns an order confirmation Definition: Buyer determines to place an order and has a valid Seller's Customer ID Action: Place Order	
Recognized Events:	Buyer receives product Buyer fails to receive product by Respond by Date Seller accepts order	
Transactions	Event: Buyer receives product Buyer fails to receive product by Respond by Date Seller accepts order	Buyer end Obtain Order Status Notify Buyer of Shipment and Debit Credit Card
	Associated Business Entity Order	Order transitions from Tendered to Confirmed or Rejected
Business Transaction Activity	Name: Obtain Order Status Description: Until the Buyer has received the product, he can decide to request the order status from the Seller. The Seller then returns the order status information. The cycle of requesting order status and sending order status information might be executed multiple times. Definition: Product not received by Buyer and Order Status needed Action: Obtain Order Status	
Recognized Events:	Buyer receives product Product not received by Buyer and Order Status needed	

Transitions:	Event: Buyer receives product Product not received by Buyer and Order Status needed	Buyer end Obtain Order Status
	Associated Business Entity Order	Order transitions from confirmed to fulfilled (product received)
Business Transaction Activity	Name: Notify Buyer of Shipment Description: If the order is acceptable as confirmed, the Seller will ship the Product and notify the Buyer of Shipment Definition: Messaging service acknowledgment that shipment notice sent Action: Notify Buyer of Shipment	
Recognized Events;	Messaging service acknowledgment that shipment notice sent	
Transitions:	Event: Messaging service acknowledgment that shipment notice sent	Seller End
	Associated Business Entity Goods Transfer	Goods transfer transitions from pending to tendered to accepted to confirmed
Business Transaction Activity	Name: Debit Credit Card Description: If the order is acceptable as confirmed, the Seller will debit the Buyer's credit card Definition: Messaging service acknowledgment that authorization for payment sent to the Bank Action: Debit Credit Card	
Recognized Events:	Messaging service acknowledgment that authorization for payment sent to the Bank	

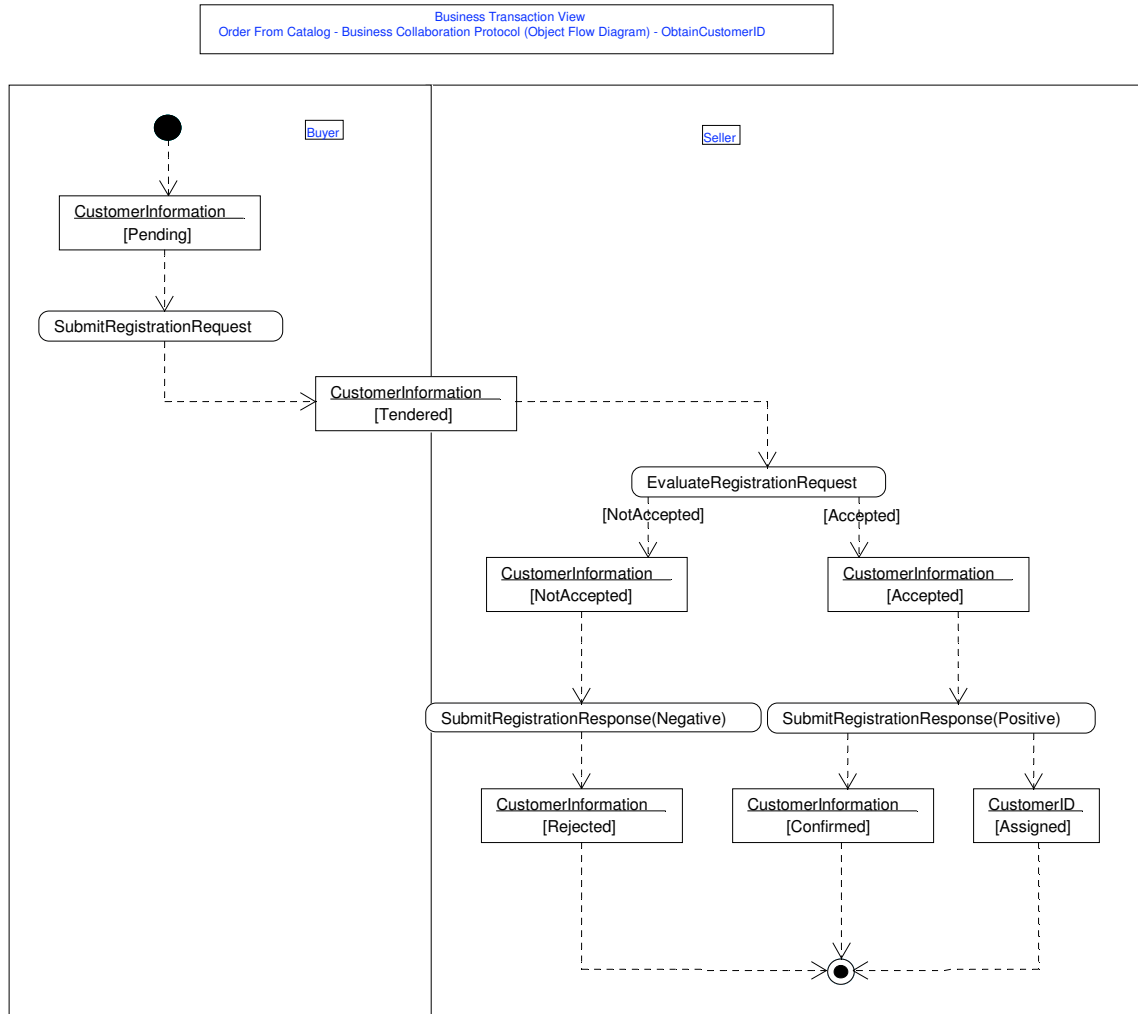
	Transitions:	Event: Transfer of funds from the Bank to the Seller	Seller End
		Associated Business Entity Account	Account transitions from funds available to authorized payment to payment
Post-conditions		<p>[Post-conditions are the rules for defining the conditions that must be true for the localized context that exists after the Business Collaboration Protocol completes. These rules are constraints that must be satisfied after the Business Collaboration Protocol thus ensuring that the proper update to context of the parent process has occurred.</p> <p>These constraint(s) must be a subset of the constraint(s) defined by the process that this Business Collaboration Protocol is defining and be computational in format. E.g.: OCL or other formal notation.]</p> <p>Buyer has a valid Product List</p> <p>Seller's Customer ID is assigned</p> <p>Price Quote is received</p> <p>Buyer's order is fulfilled</p> <p>Seller is paid</p>	

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1446 **Business Collaboration Object Flow Diagram**



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1451 **Step 2 - For each Business Transaction activity, define a business**
 1452 **transaction activity graph.**

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1454 *The Business Transaction worksheet that follows specifies the Obtain Customer ID*
 1455 *business transaction activity. Most important is the selection of Request Response as the*
 1456 *business transaction activity pattern to be used for Obtain Customer ID and the*
 1457 *specification of values for critical parameters in the Request Response pattern. Request*
 1458 *Response is chosen according to the criteria as illustrated in Figure 5: a response is*
 1459 *required, the seller does not already have the requested information, i.e., Customer ID,*
 1460 *validation of the request is required before processing, and there is no residual obligation*
 1461 *between the roles to fulfill terms of the contract. A business transaction worksheet would*
 1462 *normally be completed for each business transaction activity. The worksheet is shown*
 1463 *only for Obtain Customer ID for illustrative purposes.*

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Form: Business Transaction	
Business Transaction Name	[Provide a name for the Business Transaction.] Obtain Customer ID
Description	[A plain text explanation of the purpose and behavior of the Business Transaction.] If the Buyer decides to place an order, he must verify whether he is already registered with the Seller (since a Seller accepts only registered Buyers). If the Buyer is not already registered, he sends his Buyer information. After verification of the Buyer information and credit, the Seller returns a Customer ID.
Select Business Transaction Pattern:	Select one of: 7) Commercial Transaction 8) Request Confirm 9) Request Response 10) Query Response 11) Information Distribution 12) Notification Request Response
Secure Transport:	[True or False,] True
Non Repudiation Required:	[True or False] True
Authorization Required:	[True or False] True
Time to Perform:	[Specify the time period that this transaction must be completed within.] 2 hours
Time to Acknowledge Receipt:	[Specify the time period that a Receipt Acknowledgement must be returned by the responding role.] 10 minutes
Time to Acknowledge Acceptance:	[Specify the time period that a of an Acceptance Acknowledgement must be returned by the responding role.] 20 minutes
Partner Roles	
Initiating/Requesting Partner Type	[Partner type from collaboration.] Buyer
Initiating/Requesting Activity Role	[These are the roles that a partner must be authorized to play to issue specific transitions in the transaction (by sending certain signals).] Customer
Responding Partner Type	[See above.] Seller
Responding Partner Role	[See above.] Retailer

Requesting Business Activity			
Activity:	Submit Registration Request		
Pre-Conditions	[Business rules performed before activity is performed] No valid Seller's Customer ID on-hand		
Post-Conditions	[Business rules performed after activity is performed] Buyer has a valid Seller's Customer ID		
Number of Retries:	3		
Information Envelope:	Registration Request		
Information Type:	Structured Information		
Information State:	[Identify the Information Envelope allowed state(s.)] Pending Tendered Rejected Confirmed		
Information Security:	Are Contents Confidential?	[True or False] True	
	Is the Envelope Tamperproof?	[True or False] True	
	Authentication Required?	[True or False] True	
Business Information Manifest	[Enter the name(s) of the Business Information contained in envelope.]		
	Business Information Name	[Enter name] Registration Request	
	Information Type:	[Enter type] Structured Information	
	Information State:	[Identify the Business Information allowed state(s).] Mandatory	
	Information Security:	Are Contents Confidential?	[True or False] True
		Is the Envelope Tamperproof?	[True or False] True
		Authentication Required?	[True or False] True
Responding Business Activity			

Activity:	Submit Registration Response			
Pre-Conditions	[Business rules performed before action is executed] Registration Request received but not evaluated for complete and valid information nor credit verified			
Post-Conditions	[Business rules performed after action is executed] Seller's Buyer ID is assigned if Buyer Information is complete and credit check is positive			
Validation of Request Required:	[True or False] True			
Information Envelope:	[Enter Name] Registration Response			
Information Type:	[Enter Type] Structured Information			
Information State:	[Identify the Information Envelope allowed state(s).] Accepted Not Accepted			
Information Security:	Are Contents Confidential?	[True or False] True		
	Is the Envelope Tamperproof?	[True or False] True		
	Authentication Required?	[True or False] True		
Business Information Manifest List:	[Enter the name of the Business Information contained in envelope]			
	Business Information Name	[Enter name] Registration Response		
	Information Type:	[Enter Type] Structured Information		
	Information State:	[Identify the Business Information allowed state(s).] Mandatory		
	Information Security:	Are Contents Confidential?	[True or False] True	
		Is the Envelope Tamperproof?	[True or False] True	
		Authentication Required?	[True or False] True	

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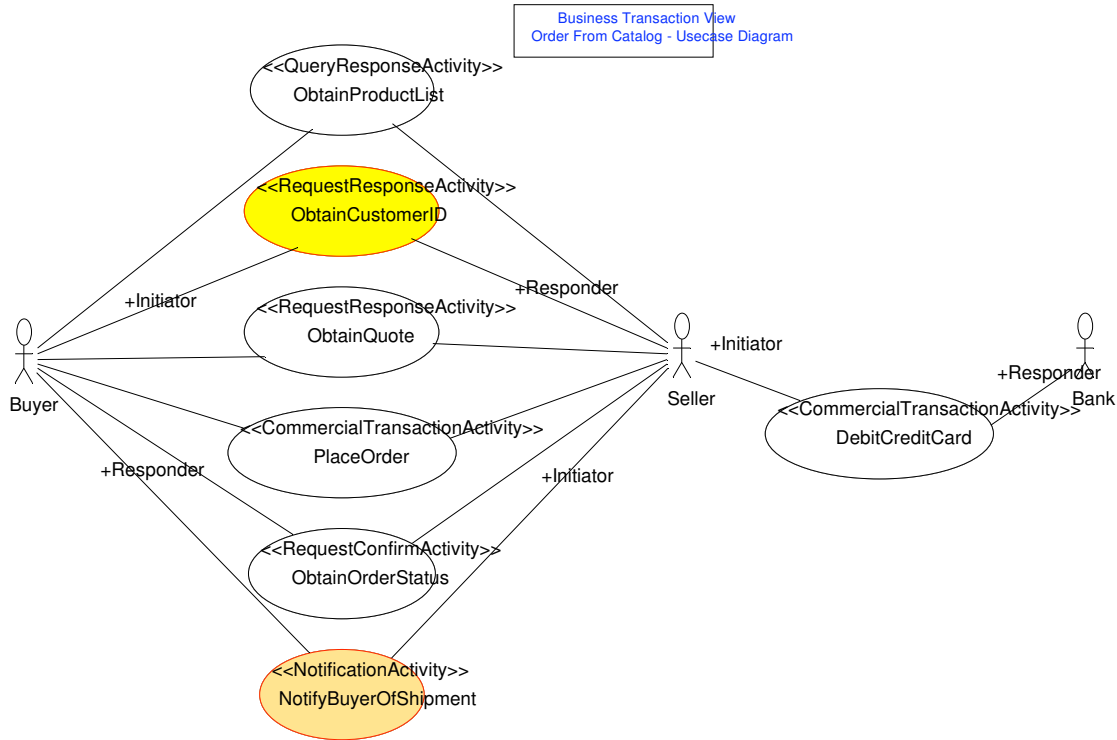
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1470 *The BTV Use Case diagram that follows identifies the business transaction pattern*
 1471 *selected for each business transaction activity in the order from catalog collaboration. In*
 1472 *addition, the initiator and responder roles of the trading partners/actors are identified.*

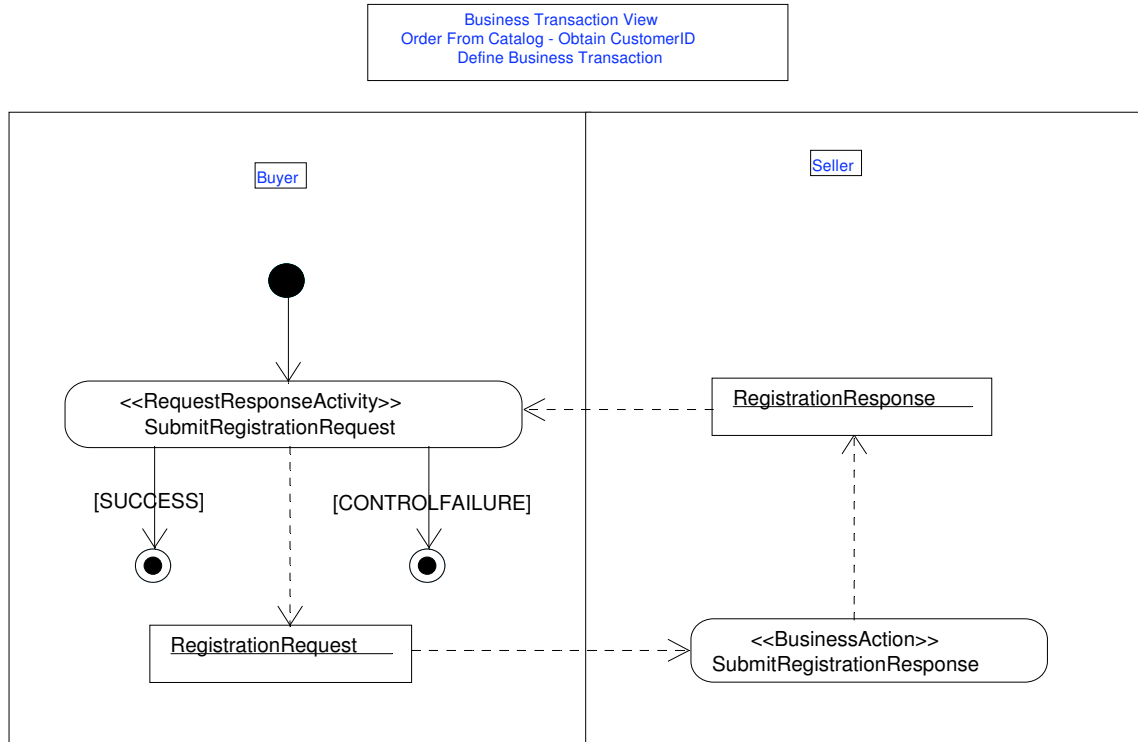
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 1481 *The Request Response business transaction pattern for Obtain Customer ID is illustrated*
 1482 *to show how this business transaction pattern is instantiated for the example business*
 1483 *transaction activity, in terms of authorized roles of Buyer and Seller, initiating and*
 1484 *responding business activities of Submit Registration Request and Submit Registration*
 1485 *Response, and Registration Request and Registration Response business information.*

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Step 3 - Create class diagrams by re-using existing information structure

Business Information worksheets are completed in this illustration for the Registration Request and Registration Response Business Information for the Obtain Customer ID business transaction activity. The Final Business Information Model class diagram that follows illustrates the contents of these worksheets. Only one set of Business Information is contained in the request and response Information Envelopes, i.e., Registration Request and Registration Response. Thus the same name is given to the Information Envelopes and contained Business Information. Information Entities include the Header Information and Body Information of the Business Information for both the Registration Request and Registration Response, in that they are structured messages. The Request Header Information is associated with the Customer Information Business Entity, in that it contains Information Entities that are required to transition the state of the Customer Information Business Entity. The Information Entities are shown as specified characteristics or attributes of Business Information in the worksheet, and are illustrated as attributes of reusable Information Objects in the Final Business Information Model.

Form: Business Information	
Business Information Name:	[Provide the name that this Business Information is identified by.] Registration Request
Description:	[A plain text explanation of the purpose and behavior of the Business Information.] Information about a prospective Buyer that is required by the Seller in order for the seller to register the Buyer and assign a Seller's Customer ID
Business Information Characteristics	Define the set of characteristics or attributes that define the structural aspects of the Business Information. Name: [Enter the name of the characteristic.] Type: [Enter the type of the characteristic. e.g. this is referred to business information.] Constraints: [The rules for defining the conditions that must be true for the inclusion and/or validation of this characteristic. These rules may be computational in format. e.g.: OCL or other formal notation.]

Characteristics or Attributes	Name	Type	Constraint
	Reference Number – Registration Request Header Information	String	Mandatory
	Respond by Date - Registration Request Header	Date	Mandatory
	Legal Name - Party	String	Mandatory
	Short Name - Party	String	Optional
	Official Registration ID - Party	String	Optional
	Registration Authority - Party	String	Optional
	Bank Identification Number - Account	Integer	Mandatory
	Account Type - Account	String	Mandatory
	Account Identification Number - Account	Integer	Mandatory
	Account Holder - Account	String	Mandatory
	Balance - Account	Currency	Mandatory
	Start Date - Account	Date	Mandatory
	End Date - Account	Date	Mandatory
	Addressee - Address	String	Mandatory for Bill to Address; Optional for Ship to Address if same as Bill to Address
	Postal Code - Address	String	Mandatory for Bill to Address; Optional for Ship to Address if same as Bill to Address
	Postal Code Location - Address	String	Mandatory for Bill to Address; Optional for Ship to Address if same as Bill to Address
Phone Number - Address	String	Mandatory for Bill to Address;	

Business Information Behavior	Define the set of operations that affect the behavioral aspects of the Business Information.
Name:	[Enter the name of the operation.] Obtain Customer ID
Lifecycle:	[Enter the name of the lifecycle that defines this behavior.] Registration Lifecycle

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Form: Business Information	
Business Information Name:	[Provide the name that this Business Information is identified by.] Registration Response
Description:	[A plain text explanation of the purpose and behavior of the Business Information.] After verification of the Customer information and credit, the Seller returns a Seller's Customer ID.
Business Information Characteristics	Define the set of characteristics or attributes that define the structural aspects of the Business Information. Name: [Enter the name of the characteristic.] Type: [Enter the type of the characteristic. e.g. this is referred to business information.] Constraints: [The rules for defining the conditions that must be true for the inclusion and/or validation of this characteristic. These rules may be computational in format. e.g.: OCL or other formal notation.]

Characteristics or Attributes	Name	Type	Constraint
	Reference Number – Registration Request Header Information	String	Mandatory
	Status – Registration Body Information	String	Mandatory
	Reason – Registration Body Information	String	Mandatory
	Code – Registration Body Information	String	Mandatory
	Customer ID – Registration Body Information	String	Mandatory
Business Information Behavior	Define the set of operations that affect the behavioral aspects of the Business Information.		
Name:	[Enter the name of the operation.] Obtain Customer ID		
Lifecycle:	[Enter the name of the lifecycle that defines this behavior.] Registration Lifecycle		

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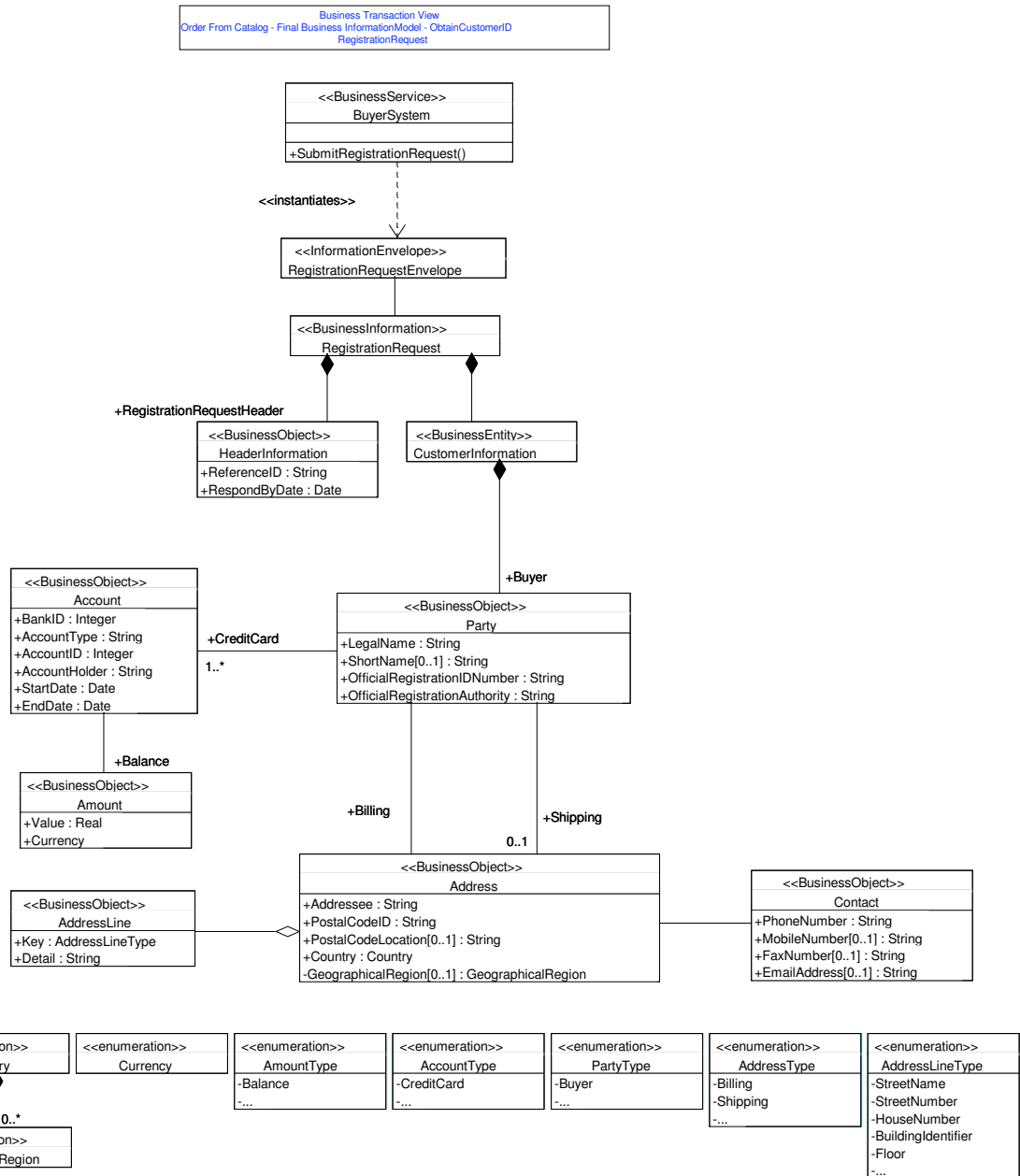
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1520 **Final Business Information Models**

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1522 **Registration Request**

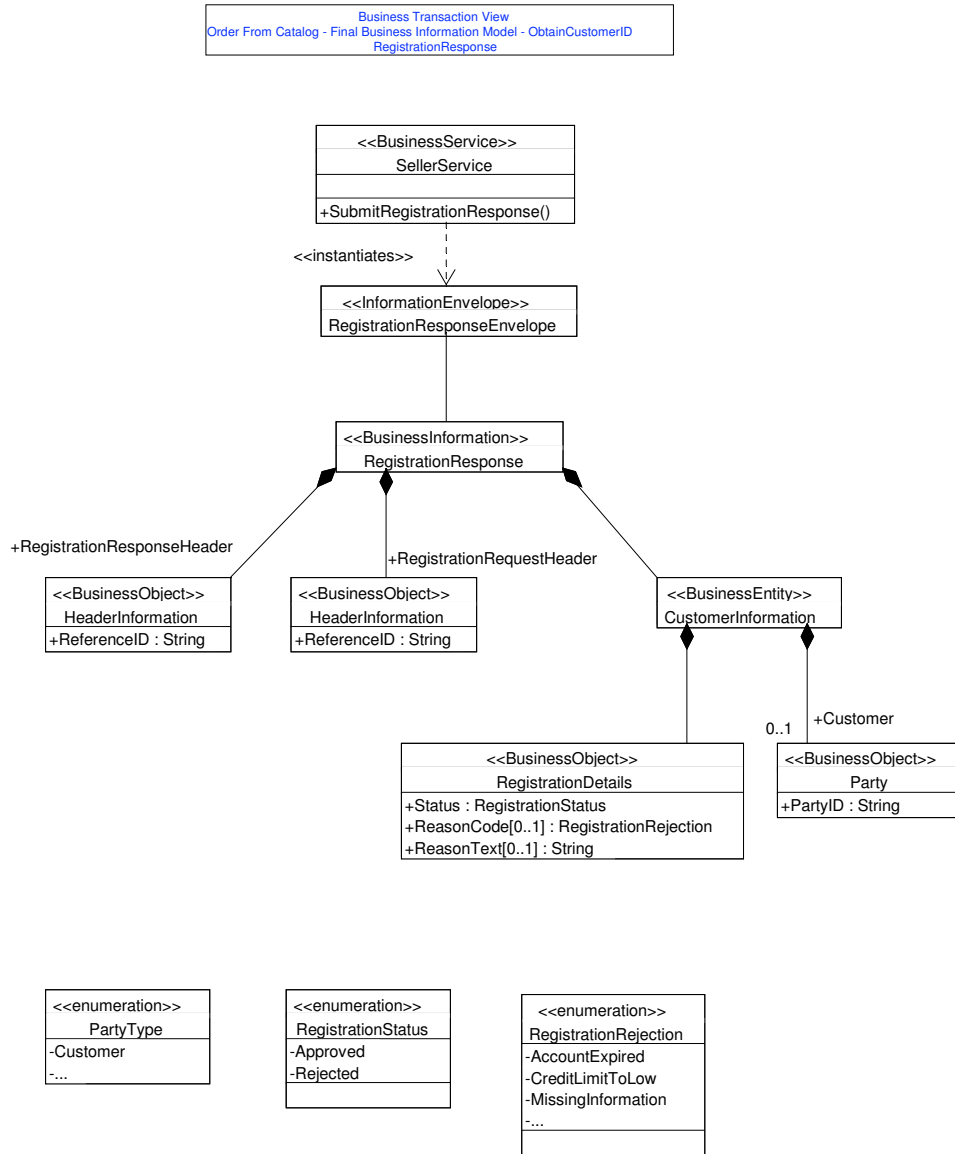
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1526 **Registration Response**
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 1528



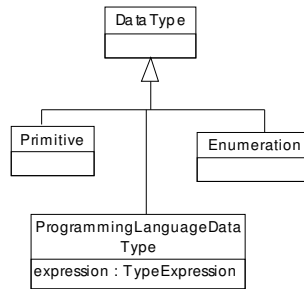
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1530 **Appendix C. UMM Data Types and Notation**

1531 **UMM Data Types**

1532 In UML a data type is defined as “A descriptor of a set of values that lack identity and whose
 1533 operations do not have side effects. Data types include primitive pre-defined types and user-
 1534 definable types. Pre-defined types include numbers, string and time. User-definable types include
 1535 enumerations. An enumeration is a user-defined data type whose instances are a set of user-
 1536 specified named enumeration literals. The literals have a relative order but no algebra is defined
 1537 on them.” UML avoids specifying the syntax for constructing type expressions because they are
 1538 so language-dependent. It is assumed that the name of a class or simple data type will map into a
 1539 simple Classifier reference. In the UML Meta-Model data type is defined as follows:

1540

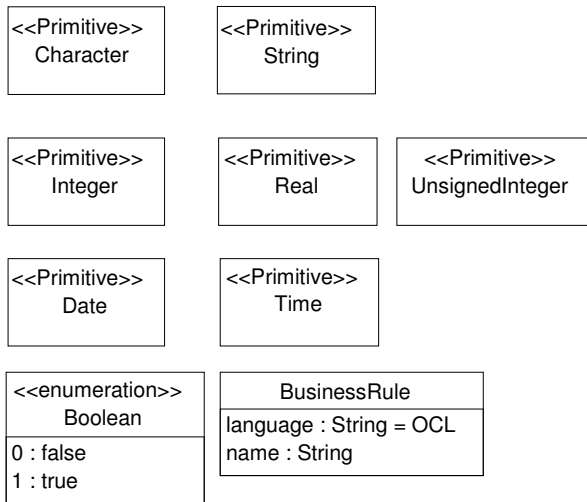


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1542

Fig. 1

1543 Since UMM focuses on the Business Operational View, it is independent of any language used as
 1544 transfer-syntax or as programming language to build B2B applications. As a consequence, UMM
 1545 also avoids specifying syntax for constructing type expressions. The UMM set of data types is
 1546 depicted in Fig. 2. These types must be used in UMM-compliant models. It is assumed that
 1547 language-specific mappings will be defined to map UMM data types to transfer-syntaxes and
 1548 programming languages. In addition to these data types UMM defines an additional set of
 1549 enumerations that are relevant in a business environment. These data types are depicted in
 1550 Fig. 3.



1552

Fig. 2

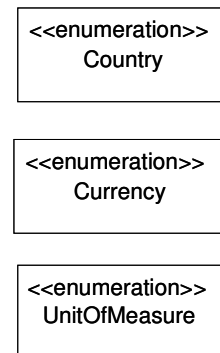


Fig. 3

1553 Boolean

1554 Boolean defines an enumeration that denotes a logical condition. Its enumeration literals are:

1555 true The Boolean condition is satisfied.

1556 false The Boolean condition is not satisfied.

1557 Business Rule

1558 A Business Rule is an expression that defines a statement that will evaluate to a (possibly empty)
1559 set of instances when executed in a context. An Expression does not modify the environment in
1560 which it is evaluated. An expression contains an expression string and the name of an
1561 interpretation language with which to evaluate the string.

1562 Attributes:

1563 **language** Names the language in which the business rule body is represented. In UMM the value of
1564 language is fixed to “OCL”, since all business rules must be represented in the Object Con-
1565 straint Language.

1566 **body** The text of the business rule expressed in the Object Constraint Language.

1567

1568 Character

1569 Character is a classifier element that is an instance of Primitive. An instance of Character defines
1570 a single character. Note, the data type String defines text consisting of multiple characters.

1571 Date

1572 Date is a classifier element that is an instance of Primitive, representing the predefined type of
1573 date. Note, the type of date is limited to Year, Month and Date and is not able to capture time
1574 aspects, which are handled by the data type Time. Instance of Date follow the format YYYY-MM-
1575 DD (Date Part in ISO 8601). However, a date is always subject to implementation considerations,
1576 and must be mapped to the date format of the FSV technology of choice.

1577 Integer

1578 Integer is a classifier element that is an instance of Primitive, representing the predefined type of
1579 integers. An instance of Integer is an element in the (infinite) set of integers (...-2, -1, 0, 1, 2...).

1580 Real

1581 Real is a classifier element that is an instance of Primitive, representing the predefined type of
1582 reals. An instance of Real is an element in either the set of rational numbers or the set of
1583 irrational numbers.

1584 String

1585 String is a classifier element that is an instance of Primitive. An instance of String defines a piece
1586 of text.

1587 Time

1588 Time is a classifier element that is an instance of Primitive, representing the predefined type of
1589 time. Note, the type of time is limited to Hours, Minutes, Seconds and the time off-set. It is not
1590 able to capture date aspects, which are handled by the data type Date. Instance of Time follow
1591 the format hh:mm:ss+hh:mm (Time Part in ISO 8601). However, a time is always subject to
1592 implementation considerations, and must be mapped to the time format of the FSV technology of
1593 choice.

1594 UnsignedInteger

1595 UnsignedInteger is a classifier element that is an instance of Primitive. It defines a data type
1596 whose range is the non-negative integers.
1597

1634 **unit** **UnitOfMeasure** The type of unit of measure as an element of the enumeration of
 1635 UnitOfMeasure (referencing UN/ECE Rec. 20)

1636
 1637 **Period**

1638 Period is a business object used to define a period starting on a date or/time and ending on a
 1639 date/or time.

1640 **Attributes:**

1641 startingDate Date The starting date of a period as an instance of Date.
 1642 startingTime Time The starting time of a period as an instance of Time.
 1643 endingDate Date The ending date of a period as an instance of Date.
 1644 EndingTime Time The ending time of a period as an instance of Time.

1646

1647

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1650

1651 **Business Transaction View Notation**

1652

1653 An information envelope includes the business information exchanged between partners in a
 1654 business transaction.

1655 The business information is composed of the business entities that change their state as a result
 1656 of the exchange. The change in state of a business entity is based on information that affects the
 1657 business entity. This information is modelled by assembling business objects. E.g. the business
 1658 entity "CustomerInformation" is composed of a business object "Party" that assembles further
 1659 business objects. Furthermore, the business information might include information that is
 1660 independent of the exchanged business entities. This information is also modelled by business
 1661 objects. Candidates for the latter case might be a business object "Document" that carries the
 1662 attributes "DocumentID" and "DocumentCreationDate".

1663 This approach assumes the existence of a library of re-usable business objects. A reference
 1664 source to develop new reusable business objects is Core Components. These Core Components
 1665 provide the business semantics that will be used to develop the business object attributes and
 1666 relationships that apply in a given context. It should be noted that the class diagram associated
 1667 with Core Components represent semantic relationships and most likely are not identical to the
 1668 business object class diagram which follows strict UML object oriented modelling principles,
 1669 concepts and rules.

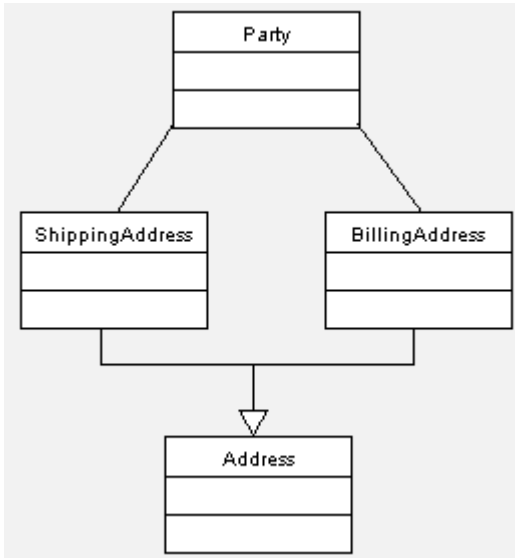
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1671 How do we set a re-usable business object in context?

1672

1673 (a) Generalization

1674

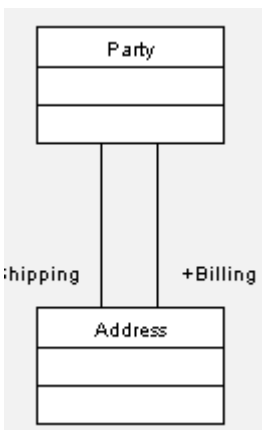


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1678 (b) Association role

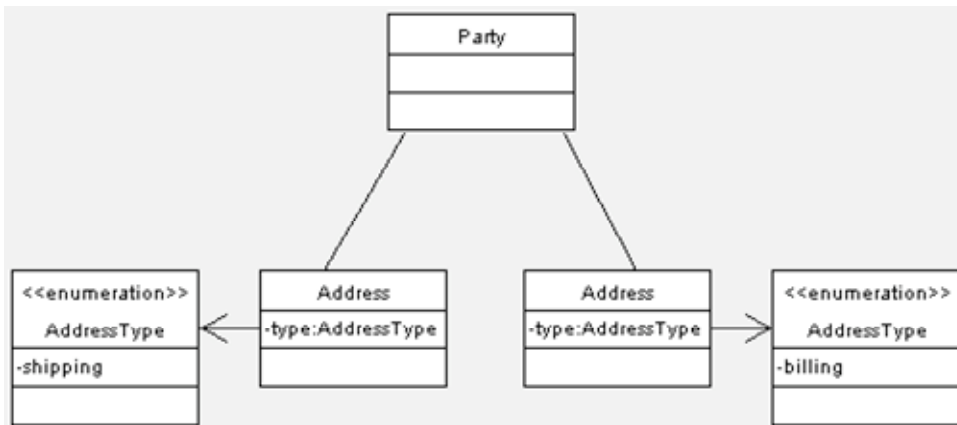


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1681

1681 (c) Enumeration



1682

1683

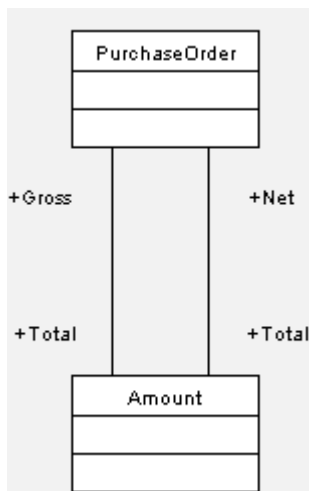
1684 In order to re-use a given business object in a class diagram modelling business information and
 1685 to set it in context the approach using association roles (b) is the preferred way.

1686 We do not use the generalization approach (a) to set re-usable business objects in context.
 1687 However, the generalization approach might be used to define new business objects in case of
 1688 extending a more general one by adding new attributes. E.g. a general business object
 1689 "ProductOrService" might have a sub-class (=new business object) "FlightProduct" extending the
 1690 general one by flight specific attributes.

1691 We do not use the approach based on enumerations (c), since it is a very bad modelling
 1692 technique to intermix the schema level and the instance level, i.e. part of the schema information
 1693 is expressed by an instance of an enumeration.

1694 However one problem with the association role approach is that the following is not allowed:

1695



1696

1697

1698 There is a maximum of 1 association role per each end of an association. If two qualifiers that are
 1699 orthogonal to each other define the context in which a business object is used, the approach
 1700 using association roles (b) fails.

1701 **Appendix D. Administrative Information**

1702

1703

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1708 arising from correct or incorrect implementation or use of this design.

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1719

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