Creating A Single Global Electronic Market

Business Process and Business Information Analysis Overview

Analysis to Deployment of Business Process and Business Information Definitions

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1 Status of this Document

This document specifies an ebXML WORK IN PROGRESS – NOT FOR IMPLEMENTATION for the electronic business community.

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4 Introduction

4.1 Summary

The vision of ebXML is to create a single global electronic marketplace where enterprises of any size and in any geographical location can meet and conduct business with each other through the exchange of XML based messages. ebXML enables anyone, anywhere, to do business with anyone else on the internet.

In order for enterprises to conduct electronic business with each other, they must first discover each other and the products and services they have to offer. They then must determine which business processes and documents are necessary to obtain those products and services. After that, they need to determine how the exchange of information will take place and then agree on contractual terms and conditions. Once all of this is accomplished, they can then exchange information and products/services according to these agreements.

To facilitate this, ebXML provides an infrastructure for data communication interoperability, a semantics framework for commercial interoperability, and a mechanism that allows enterprises to find, establish a relationship, and conduct business with each other.

Data communication interoperability is ensured by a standard message transport mechanism with a well-defined interface, packaging rules, and a predictable delivery and security model, as well as an interface to handle incoming and outgoing messages at either end.

Commercial interoperability is provided by means of a metamodel for defining business processes and information models. ebXML recommends a methodology and provides a set of worksheets and guidelines for creating those models. A business library (catalog) of business process and information models promotes business efficiency by encouraging reuse of business processes or parts of predefined business processes.

In order for the actual conduct of business to take place, ebXML provides a shared repository where businesses can discover each other's products/services by means of partner profile information, a process for establishing an agreement to do business (Collaboration Protocol Agreement, or CPA), and a shared repository for company profiles, business process models, and relevant business messages.

4.2 Scope and Audience

This document deals with aspects of commercial interoperability, specifically the process by which enterprises can analyze, identify, and define those business processes and business documents necessary for the conduct of electronic business with other enterprises, within the ebXML framework.

The audience for this document will typically comprise representatives of any of a number of different functional areas within an enterprise, including marketing, business development, executive management, procurement, software development, IT, etc.

4.3 Related Documents

ebXML Technical Architecture Specification. Version 1.0.4. 16 February 2001. ebXML Technical Architecture Project Team.

UN/CEFACT Modelling Methodology. CEFACT/TMWG/N090R9. February 2001. UN/CEFACT Technical Modeling Working Group.

Information Technologies - Open-EDI Reference Model. ISO/IEC 14662:1997(E). International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC).

ebXML Business Process Analysis Worksheets and Guidelines. WORK-IN-PROGRESS. Version 0.9. March 10, 2001. ebXML Business Process Project Team.

ebXML Catalog of Business Processes. Version 0.9. Date March 17, 2001. ebXML Business Process Project Team.

ebXML E-Commerce and Simple Negotiation Patterns. Version .3. Date March 17, 2001. ebXML Business Process Project Team.

ebXML Business Process Specification Schema. Version 0.90. 01/17/2001. Context/Metamodel Group of the CC/BP Joint Delivery Team.

ebXML Methodology for the Discovery and Analysis of Core Components. DRAFT. Version 1.0.1. February 16, 2001. ebXML Core Components Project Team.

ebXML The role of context in the re-usability of Core Components and Business Processes ebXML Core Components. Version 1.01. February 16, 2001. ebXML Core Components Project Team.

ebXML specification for the application of XML based assembly and context rules. Version 1.01. 16 February 2001. ebXML Core Components.

ebXML TA Glossary. Version 0.95 (TBD). 12 February 2001 (TBD). Technical Architecture Project Team.

ebXML Registry Information Model. Version 0.56. Working Draft. 2/28/2001. ebXML Registry Project Team.

ebXML Registry Services. Version 0.85. Working Draft. 2/28/2001. ebXML Registry Project Team.

4.4 Document Conventions

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this document, are to be interpreted as described in RFC 2119 [Bra97].

Heretofore, when the term *Metamodel* is used, it refers to the e-Business Process Metamodel as defined in the *UN/CEFACT Modelling Methodology* [UMM].

Heretofore, when the term *Specification Schema* is used, it refers to the metamodel and its DTD form as defined in the *ebXML Business Process Specification Schema* [BPSS].

5 Goal and Objectives

5.1 Goal

The goal of this document is describe the analysis process in such a way that the audience will have a general understanding of how to conduct business process and documentation definition and identification, within the ebXML framework, and how that relates to the overall development of electronic business relationships with other enterprises.

5.2 Objectives

In order to accomplish the goal, as set for in 5.1 above, this document will:

- Provide an overview of electronic business collaboration
- Discuss the role and use of business process modeling
- Describe the analysis process
- Discuss economic elements in Business Processes
- Establish the relationship of core components to business processes

5.3 Caveats and Assumptions

The intent of this document is to provide a general overview of business process and business document analysis. It is not intended to be a specification.

It is assumed that the audience has some general understanding of the ebXML framework and is particularly familiar with the Technical Architecture Specification.

6 Business Collaboration Overview

6.1 ebXML Electronic Business Collaboration

The strength of the ebXML technical architecture is that it provides a framework for electronic business collaboration. The architecture enables businesses to work together to specify business process, discover each other, negotiate collaboration agreements, and execute business processes. The significant activities in this ebXML electronic business collaboration are shown in Figure 6.1-1.

The overall process starts with Process Definition, utilizing Business Process and Business Document Analysis and logically progresses to Partner Discovery, Partner Sign-Up, Electronic Plug-in, Process Execution, Process Management, Process Evolution and then finally back to Process Definition.

- **Process Definition**: Utilizing Business Process and Business Document Analysis, an enterprise determines and defines which processes will be necessary for electronic

commerce. In some cases, a community of trading partners – for example AIAG[1] or RosettaNet[2] – MAY define the business processes to be used in the community. These business processes are defined according to a well known model and described in agreed upon formats.

- **Partner Discovery**: Enterprises identify potential electronic trading partners through a search of company profiles held in ebXML compliant registries.
- **Partner Sign-up**: Trading partners then negotiate agreements that will serve as the terms and conditions of their collaboration.
- **Electronic Plug-in**: The trading partners then configure their electronic interfaces and business services according to their agreements.
- **Process Execution**: Businesses exchange documents and complete commercial transactions in accordance with their agreements and carry out the agreed upon business processes.
- **Process Management**: The business processes defined in the Process Definition phase and agreed to in the Partner Sign-Up phase are monitored for compliance with trading partner agreements and successful execution.
- **Process Evolution**: Participants in the electronic marketplace will evaluate their existing processes, improve them through process re-engineering, and create new processes to meet the needs of the market.

Process Evolution is followed by Process Definition, which begins the cycle again. This model of the business collaboration process provides a very simplistic view. To further understand this process from a technical perspective, it MAY be helpful to put it in the context of what the UN/CEFACT Modeling Methodology (UMM) calls the Functional Service View (FSV) of business transactions.

[1] The AIAG is the Automotive Industry Action Group (http://www.aiag.org/).
[2] RosettaNet is "a consortium of major Information Technology, Electronic Components and Semiconductor Manufacturing companies" (http://www.rosettanet.org/).

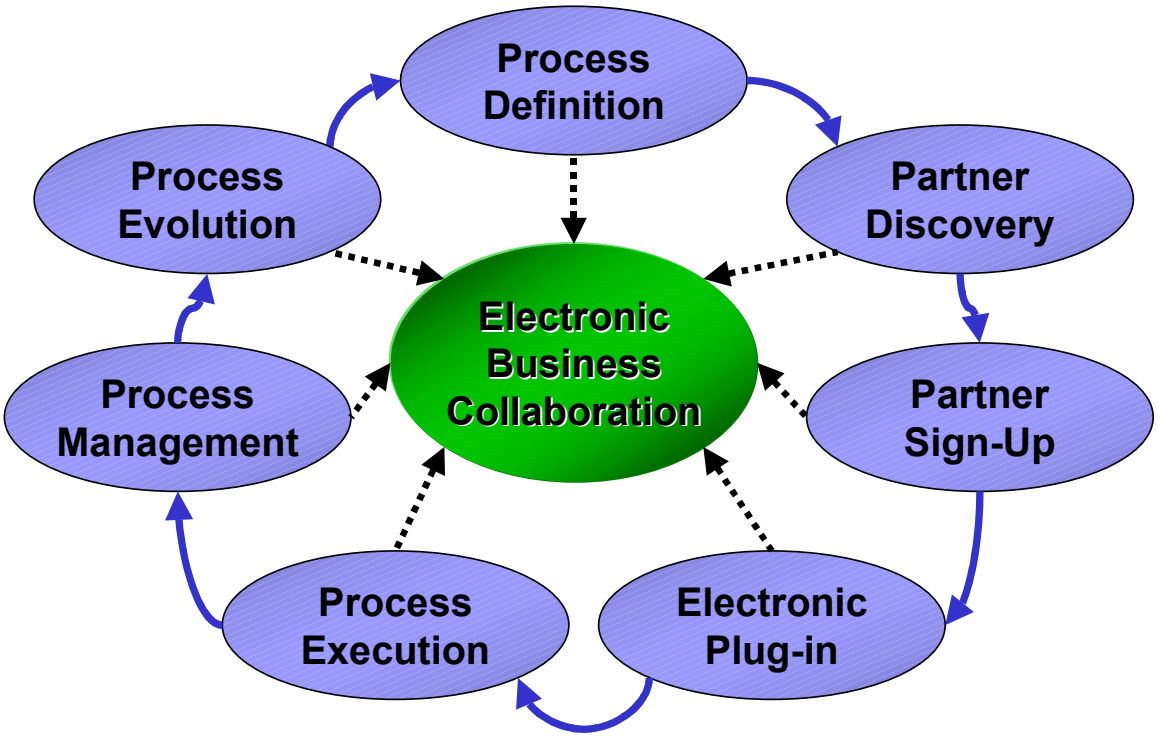

Figure 6.1-1, ebXML Business Collaboration Process

The following table shows the relationship between ebXML Project Teams, significant ebXML documents, and the activities in Figure 6.1-1.

Activity	ebXML Project Team	ebXML Document
Process Definition	Business Process, CC/BP Analysis sub-team, Registry	*UN/CEFACT Modelling Methodology*[3], *ebXML Business Process Specification Schema* , *Business Process and Business Document Analysis Overview*, *ebXML Business Process Analysis Worksheets and Guidelines*, *ebXML Catalog of Business Processes*, *ebXML The role of context in the re-usability of Core Components and Business Processes*, and *ebXML specification for the application of XML based assembly and context rules, ebXML Registry Services, ebXML Registry Information Model*
Partner Discovery	Technical Architecture, Trading Partner, Registry	*ebXML Technical Architecture Specification, Collaboration-Protocol Profile and Agreement Specification, ebXML Registry Services, ebXML Registry Information Model.*
Partner Sign-up	Trading Partner,	*Collaboration-Protocol Profile and Agreement Specification, and Business Collaboration*

[3] The UMM is not an ebXML document; however, it is a significant document which is administered by the UN/CEFACT.

	Technical Architecture	*Patterns.*
Electronic Plug-in	Technical Architecture, Trading Partner	*Collaboration-Protocol Profile and Agreement Specification, ebXML Technical Architecture Specification, Information Technologies - Open-EDI Reference Model [ISO14662E]*
Process Execution	Trading Partner, Technical Architecture, Transport, Routing and Packaging (TRP)	*Collaboration-Protocol Profile and Agreement Specification, ebXML Technical Architecture Specification, Information Technologies - Open-EDI Reference Model [ISO14662E]*
Process Management	None	*Information Technologies - Open-EDI Reference Model [ISO14662E] (Section Open-EDI Support Infrastructure)*[4]
Process Evolution	None	*None – not in scope of ebXML.*

6.2 Economic Elements in Business Processes

The most common ebXML business collaborations will be resource exchanges between companies: buying and selling products and services. The most common collaboration pattern for these exchanges will probably be order-fulfillment-payment. The ebXML Metamodel provides Economic Modeling Elements for specifying these collaborations in business and economic terms rather than in technical terms. The Economic Elements include:

- Economic Contracts: ranging from simple orders to long-term component contracts;
- Economic Resources: including products, services, and cash;
- Economic Events: including product or service deliveries, and payments;
- Partner Types: including the parties and roles authorized to commit and exchange resources in business collaborations.

Using these elements, it will be possible to determine in a business collaboration:

- when an Economic Contract is formed;
- when an Economic Event should be recognized;
- when an Economic Resource or a claim to a resource should be recognized in accordance with generally accepted accounting principles (GAAP);
- whether or not a delivery fulfills a commitment;

[4] The *Information Technologies - Open-EDI Reference Model* [ISO14662E] is not an ebXML document. It is a significant document for the UMM and the ebXML Technical Architecture Specification.

- what events may follow if a delivery does not fulfill an order;
- when an exchange is complete from a business point of view;
- and many other aspects of typical business relationships.

Using the ebXML Economic Modeling Elements, these typical business collaboration patterns can be designed once and re-used in many situations[5]. Figure 8.3-2 provides an overview of the REA economic elements in a typical product-oriented Order-Fulfillment Business Process.

The above concepts and relationships are specified in the UMM, but there is no programmatic support for them in the first version of the *ebXML Business Process Specification Schema* [BPSS]. They could, however, be implemented in business collaboration management software based on the UMM Metamodel.

6.3 ebXML Design Time and Runtime Reference Model

Design Time and Runtime components of the ebXML architecture are found in Figure 6.3-1

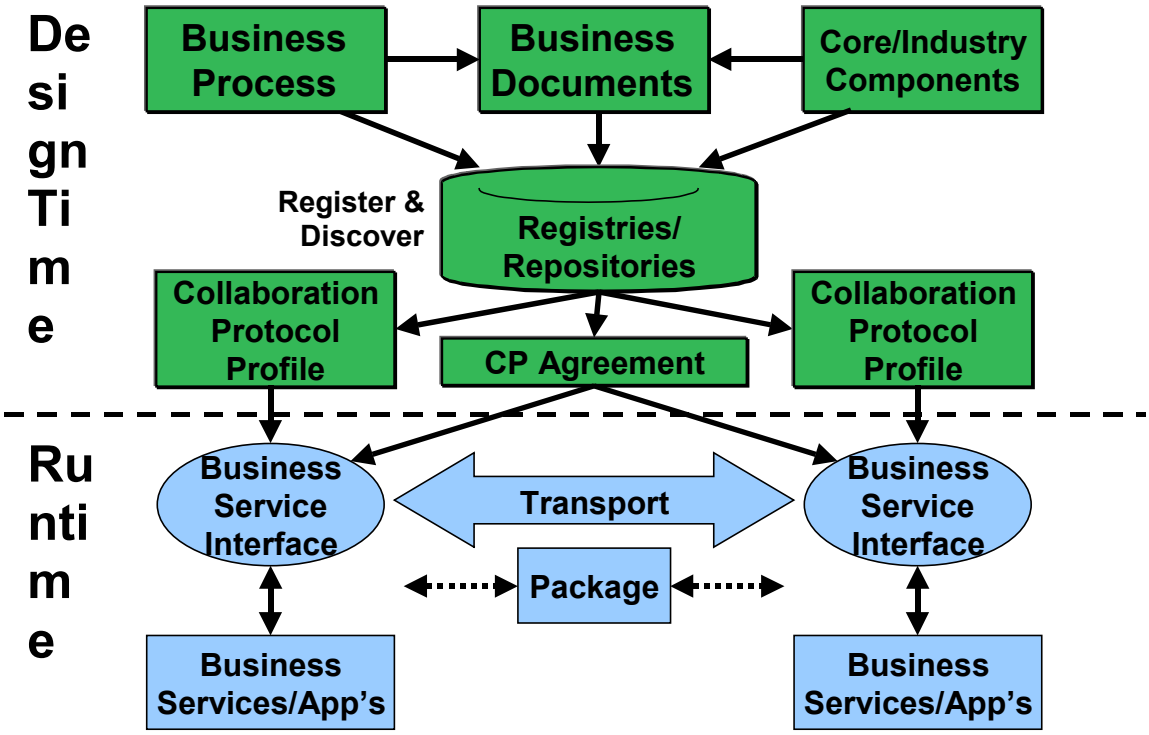

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Figure 6.3-1, ebXML Design Time and Runtime Reference Model

[5] The ebXML Economic Modeling Elements are based on the Resource-Event-Agent (REA) Enterprise Ontology -- a well accepted, well reviewed, and published economic modeling framework for business enterprises of all sizes. REA component descriptions are available at http://www.reamodel.org/.

The design time artifacts enable the runtime systems to execute the agreed business processes. Business processes and business documents are defined during the Business Process and Business Information Analysis activity. Core Components and Domain Components are the reusable information building blocks used to specify document content and structure. They can be identified and defined using the *ebXML Methodology for the Discovery and Analysis of Core Components*. The specifications/models for the defined business processes and business are stored and registered in Business Libraries which contain catalogs of business processes and business information objects (document components). These catalogs are contained using ebXML compliant registries/repositories.

The modeled business processes are referenced in the Collaboration Protocol Profiles (CPPs) of businesses and form the basis for Collaboration Protocol Agreements (CPAs) established between business parties. Ultimately, the business processes specified in the CPAs drive the business service interfaces to execute those processes and send the required documents.

For further information, see the [TAS], Section 6.3, ebXML Functional Service View, and Section 7, ebXML Functional Phases.

7 Business Process Modeling

7.1 Overview

Business process models define how business processes are described. Business processes represent the “verbs” of electronic business and can be represented using modeling tools. The specification for business process definition enables an enterprise to express its business processes so that they are understandable by other enterprises. This enables the integration of business processes within an enterprise or between enterprises.

Business process models specify interoperable business processes that allow business partners to collaborate. While business practices vary from one organization to another, most activities can be decomposed into business processes that are more generic to a specific type of business. This analysis, utilizing business modeling, will identify business processes and business information metamodels that can likely be standardized. The ebXML approach looks for standard reusable components from which to construct interoperable processes and components.

7.2 Business Process and Information Metamodel

The Metamodel is a description of business semantics that allows Trading Partners to capture the details for a specific business scenario using a consistent modeling methodology. A Business Process describes in detail how Trading Partners take on roles, relationships and responsibilities to facilitate interaction with other Trading Partners in shared Business Process. The interaction between roles takes place as a choreographed set of Business Transactions. Each Business Transaction is expressed as an exchange of electronic Business Documents. The sequence of the exchange is defined by the Business Process, messaging and security considerations. Business Documents are composed from re-useable business information components. At a lower level, Business Processes can be composed of re-useable Common Business Processes, and Business Information Objects can be composed of re- useable Business Information Objects that may be composed of core components and domain components.

The Metamodel supports requirements, analysis and design viewpoints that provide a set of semantics (vocabulary) for each viewpoint and forms the basis of specification of the semantics

and artifacts that are required to facilitate business process and information integration and interoperability.

An additional view of the Metamodel, The Specification Schema, is also provided to support the direct specification of the nominal set of elements necessary to configure a runtime system in order to execute a set of ebXML business transactions. By drawing out modeling elements from several of the other views, the Specification Schema forms a semantic subset of the Metamodel.

The Specification Schema is available in two stand-alone representations, a UML profile, and a DTD. Figure 7.2-1 shows the high-level elements of The Specification Schema.

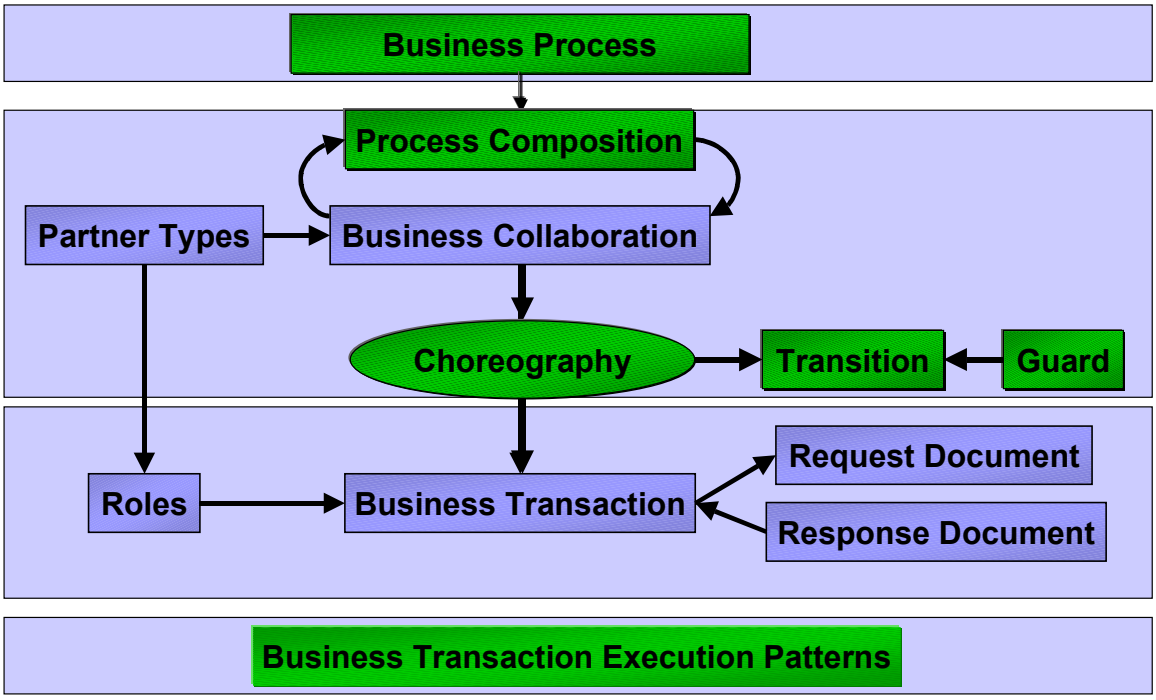


Figure 7.2-1, Specification Schema Elements Overview

The Specification Schema supports the specification of business transactions and the choreography of business transactions into Business Collaborations. Each Business Transaction can be implemented using one of many available standard patterns[6]. These patterns determine the actual exchange of Messages and signals between Trading Partners to achieve the required electronic transaction. To help specify the patterns The Specification Schema is accompanied by a set of standard patterns, and a set of modeling elements common to those patterns.

The full specification of a Business Process is defined by the Metamodel. This information serves as the primary input for the formation of Collaboration Protocol Profiles (CPP's) and CPA's. An overview of the Metamodel is shown in Figure 7.2-2:

[6] "Candidate transaction patterns include Commercial Transaction, Request/Confirm, Query/Response, Request/Response, Notification, and Information Distribution [UMM]".

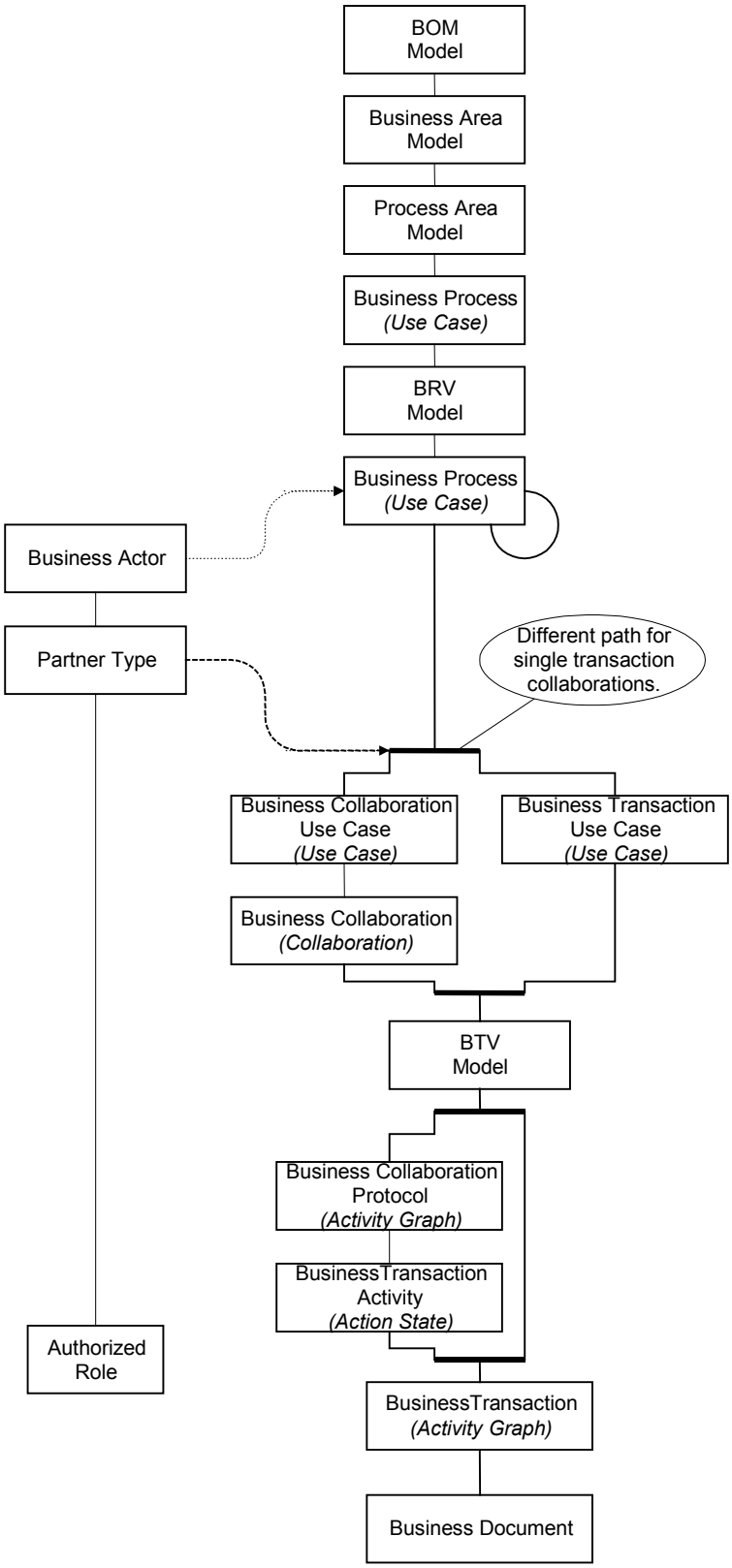


Figure 7.2-2, UMM e-Business Process Metamodel Overview

There are no formal requirements to mandate the use of a modeling language to compose new Business Processes, however, if a modeling language is used to develop Business Processes, it SHOULD be the Unified Modeling Language (UML). This ensures that a single, consistent modeling methodology is used to create new Business Processes. One of the key benefits of using a single consistent modeling methodology is that it is possible to compare models to avoid duplication of existing Business Processes. To further facilitate the creation of consistent Business Processes and information models, ebXML will define a common set of Business Processes in parallel with a Core Library. It is possible that users of the ebXML infrastructure MAY wish to extend this set or use their own Business Processes.

8 The Analysis Process

8.1 Introduction

The process described below is intended to assist enterprises with the analysis of business process and business documents necessary for engaging in electronic commerce with other enterprises. The analysis of business processes is concerned with the elaboration of the higher-level processes that are required to conduct electronic business. The analysis of business information and documents activity identifies the business documents involved in the business transactions of the collaborations of the business processes. The outputs of the analysis activities are business process definitions and business document definitions.

The analysis effort is best carried out by a cross-functional analysis team of experts from IT, marketing, software development, business analysis, procurement, etc. When applying the analysis processes described herein, it is recommended that the analysis team be staffed with people experienced in business process analysis or process re-engineering. It is also assumed that the analysts understand the challenges associated with business process analysis such as trying to analyze a business process with ill-defined requirements and objects.

The team is encouraged to use the ebXML Business Process Analysis Worksheets [BPAWAG], UML modeling tools, or business process editors that provide similar functionality (see Section,10). The team will be able to develop an ebXML Business Process Specification that can be reviewed and verified by the entire enterprise, plus all necessary information to populate models based on the *Metamodel* and *The Specification Schema*. The analysis process supports analyzing new processes and processes re-engineering as well as supporting the analysis and documentation of existing processes.

8.2 Business Processes and Business Documents

At a very basic level, a business process is “the means by which one or more activities are accomplished in operating business practices” [UMM]. Within the business process there could be one or more collaborations, each consisting of one or more transactions. Figure 8.2-1, below is a simple representation of a business process.

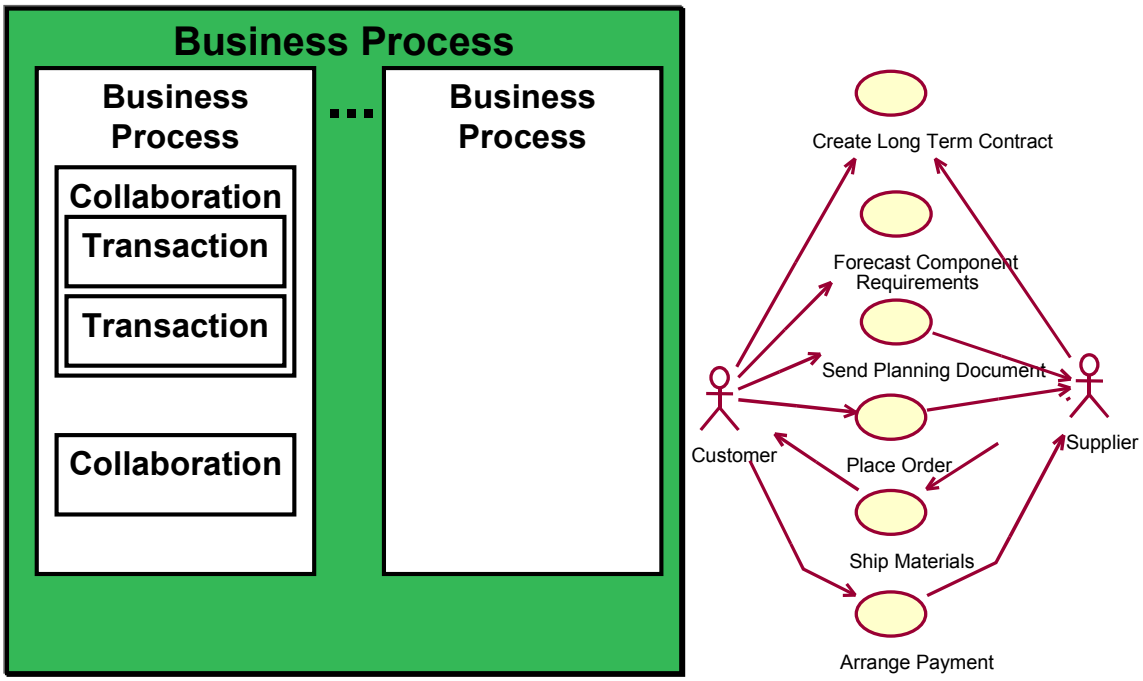


Figure 8.2-1, Business Process, Collaborations, and Transactions Conceptual View

Business document definitions are the specifications for the business document schemas and the information components that compose the business document and contained information components. A schematic representation of a business document can be seen in Figure 8.2-2, below.

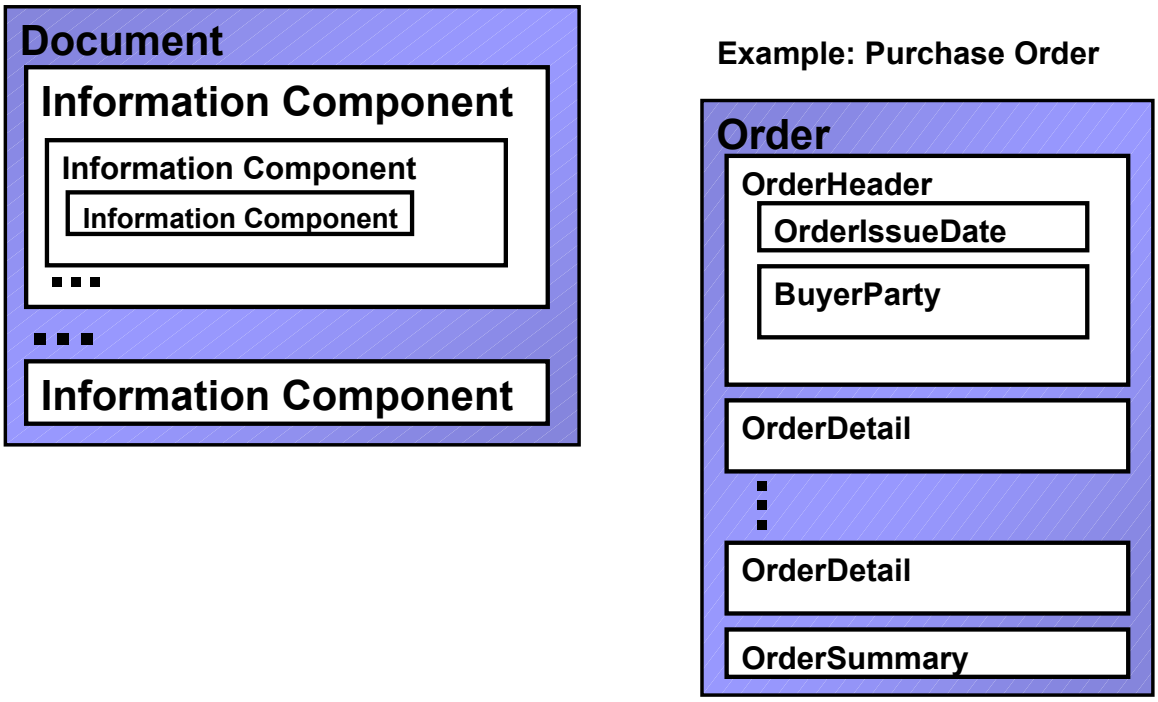


Figure 8.2-2, Document Conceptual View

Documents such as Purchase Orders, Invoices, etc., exist at the business process level and are exchanged in business transactions. Documents are put into document envelopes. They are addressed with the business identifier (e.g. DUNS number) of the recipient and sender. This is analogous to the "Attention:" line on a standard mailing address. A document envelope is placed into a message envelope and is exchanged between business service interfaces. The message envelope might be addressed with the URN of the destination business service interface. Messages have timeouts and other transaction control mechanisms associated with them. Message envelopes are placed into a transport/routing envelope for low level transmission across an e-business network. The target address on message envelope might be the URL of the destination's message-in-box service. A logical view of the nested envelope structure is shown in Figure 8.2-3.

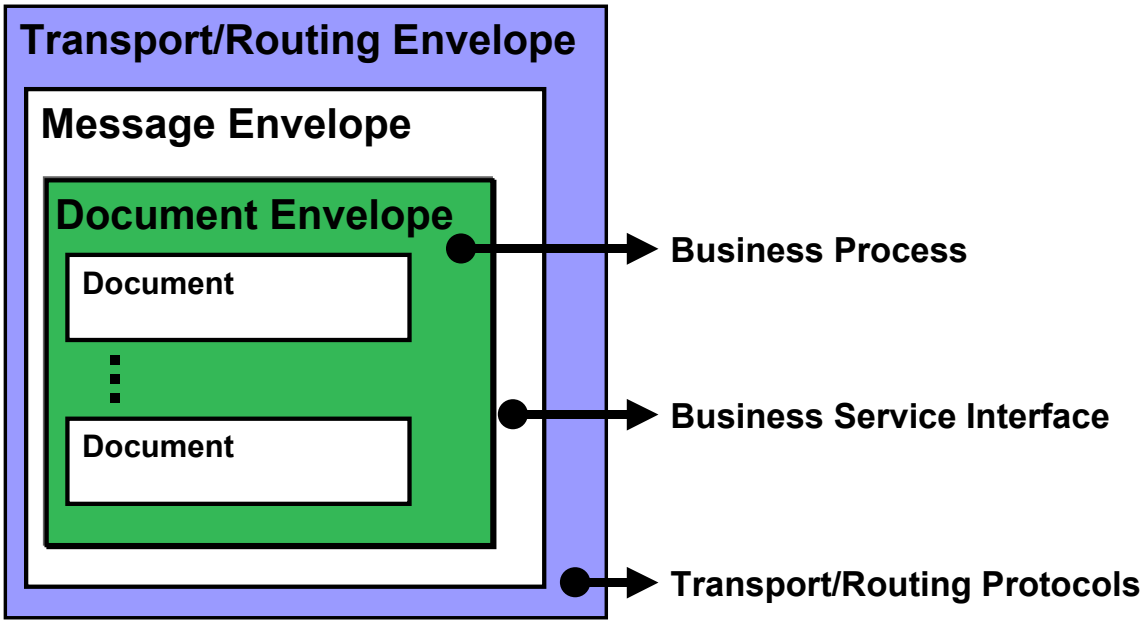


Figure 8.2-3, Messaging and Enveloping Conceptual View

8.3 Economic Elements in Business Processes

The most common ebXML business collaborations will be resource exchanges between companies: buying and selling products and services. The most common collaboration pattern for these exchanges will probably be order-fulfillment-payment. The *Metamodel* provides Economic Modeling Elements for specifying these collaborations in business and economic terms rather than in technical terms. Using the UMM Economic Modeling Elements, these typical business collaboration patterns can be designed once and re-used in many situations[7]. Figure 8.3-1 provides an overview of the REA economic elements in a typical product-oriented Order-Fulfillment Business Process..

[7] The ebXML Economic Modeling Elements are based on the Resource-Event-Agent (REA) Enterprise Ontology -- a well accepted, well reviewed, and published economic modeling framework for business enterprises of all sizes. REA component descriptions are available at http://www.reamodel.org/.

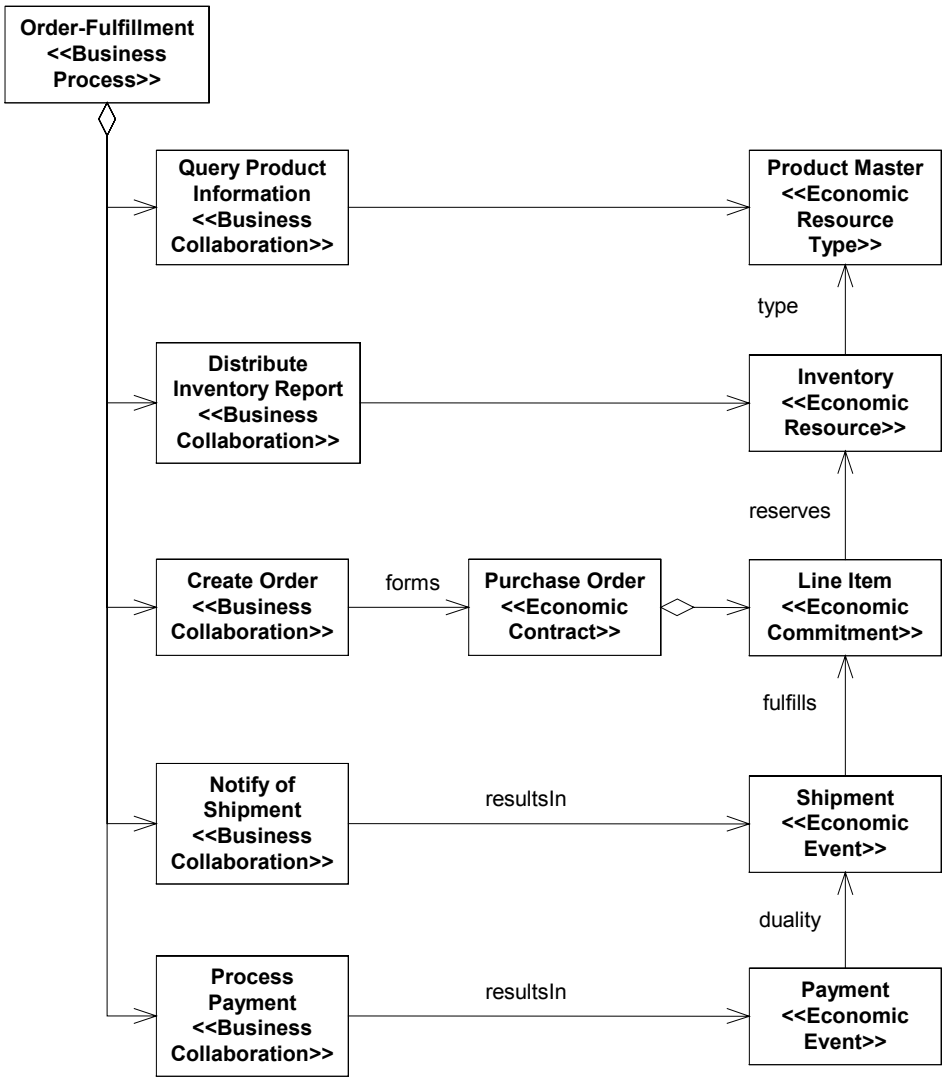


Figure 8.3-1, REA Overview for Order-Fulfillment

The Business Process is composed of several Business Collaborations, taken directly from the Catalog of Common Business Processes [CCBP] and other business libraries.

- Query Product Information receives Product Master or Catalog information about the products that can be ordered. In REA, products are Economic Resource Types.

- Distribute Inventory Report receives information about products that are currently available. This purpose could also be accomplished through a Query Availability process. In REA, inventory is an Economic Resource. Each inventory element is typed by a Product Master (Economic Resource Type).

- Create Order forms a Purchase Order (an Economic Contract) composed of Line Items (Economic Commitments). Each Line Item reserves the committed quantity of the ordered product type, due at the committed date and time.

- Notify of Shipment results in a Shipment (an Economic Event) which should fulfill one or more of the Purchase Order Line Items.

- Process Payment results in a Payment (an Economic Event) which pays for the Shipment (the REA "duality" relationship).

When all of the Line Items have been fulfilled, and all the Shipments have been paid, the Business Process is complete. The contract terms in this simple example specified "pay on receipt". Otherwise the business process might have another step, e.g. Process Invoice.

If something goes wrong, and the shipments do not fulfill the commitments, and the payments do not compensate for the shipments, or some economic event is late or otherwise incorrect, the problem can be expressed using the REA concepts and relationships explained above.

The above concepts and relationships are specified in the UMM, but there is no programmatic support for them in the first version of the *ebXML Business Process Specification Schema*. They could, however, be implemented in business collaboration management software based on the *Metamodel*.

8.4 The Analysis Process

The high-level activities related to business process and business information analysis is shown in Figure 8.4-1.

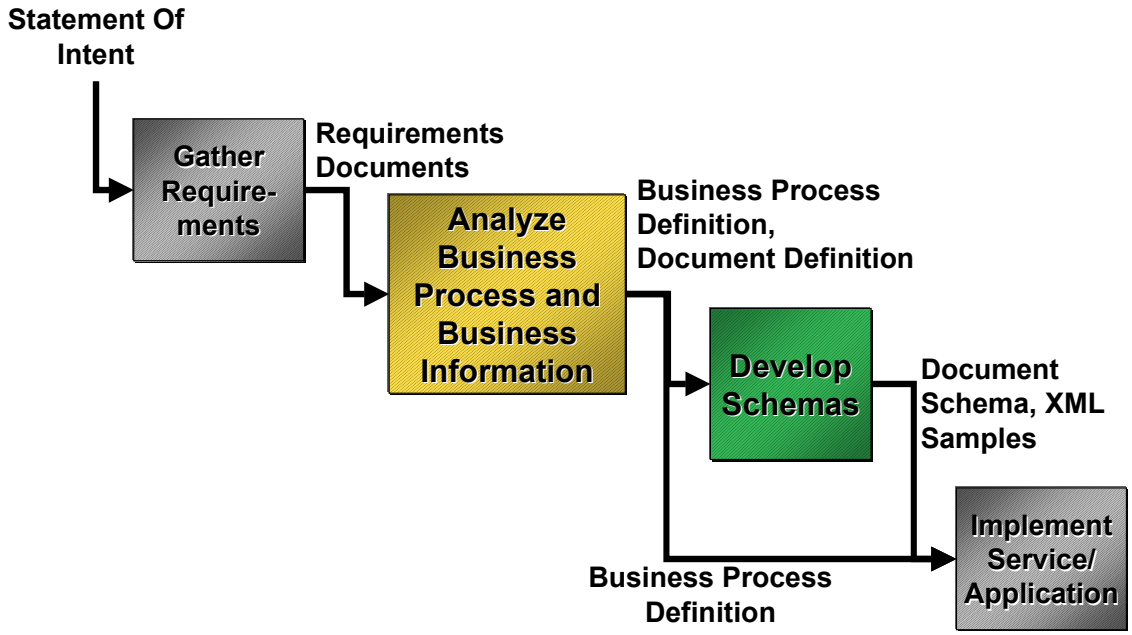


Figure 8.4-1, Activities Related to Analyzing Business Processes and Business Information

As a first step, it is useful to develop a Statement of Intent, which clearly identifies the scope and purpose of the analysis activity and serves to focus the efforts of the team.

The next step involves the gathering of requirements based on the Statement of Intent. Marketing and product management teams often perform this requirement gathering activity. The output of

this activity MAY be a marketing requirements document or a product requirements document. In any case, the result should be a set of clearly defined requirements for the analysis.

After the requirements have been defined and agreed, the actual analysis can begin. As illustrated by Figure 8.4-2, there can be many inputs to and aspects of the process required to produce the desired output. Inputs to the analysis process can come from requirements, customers and partners, standards, other existing models, and domain experts. Requirements MAY be in the form of product requirement documents, statements of work, customer change requests, etc. Customers, partners, and domain experts provide their input when they are being consulted during the requirement elaboration process and during documentation reviews. Existing standards (cross industry and industry specific) and other existing models (e.g. EDI message implementation guides) are also consulted.

The controls[8] for the analysis activities are the methodology (UMM), *Metamodel*, patterns, and other analysis techniques. These controls specify the process and information model required for the business process and information analysis process to produce correct outputs. Patterns include transaction patterns [UMM] and collaboration patterns [ECPAT].

The mechanisms for the analysis activities are the analysts, tools, and reviewers. Analysts are the people who are defining the processes and documents based on the *Metamodel*.

One of the key tools to assist with the analysis is the ebXML Business Process Analysis Worksheets, discussed in Section10, Analysis Aids: Worksheets and Tools.

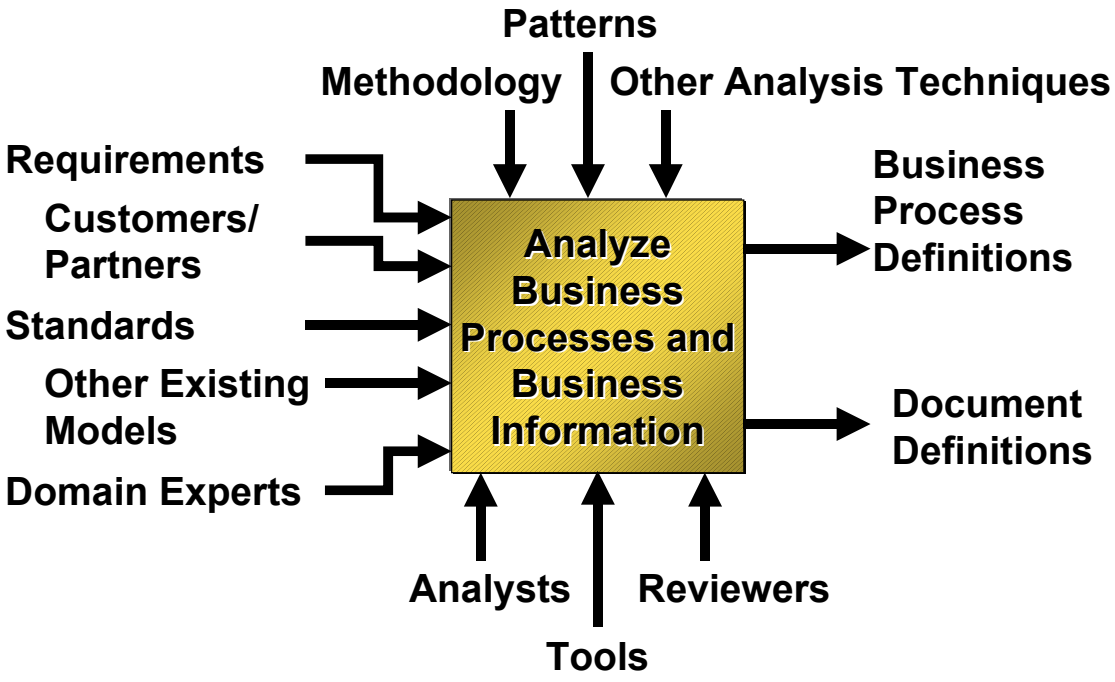


Figure 8.4-2, Analyze Business Processes and Business Information

[8] The definition of control conforms to the definition in the Integration Definition For Function Modeling (IDEF0), Federal Information Processing Standards Publication 183,1993 December 21.

The Analyze Business Processes and Business Information Activity can be logically partitioned into two separate but interrelated activities: analyze business processes and analyze business information, shown here in Figure 8.4-3:

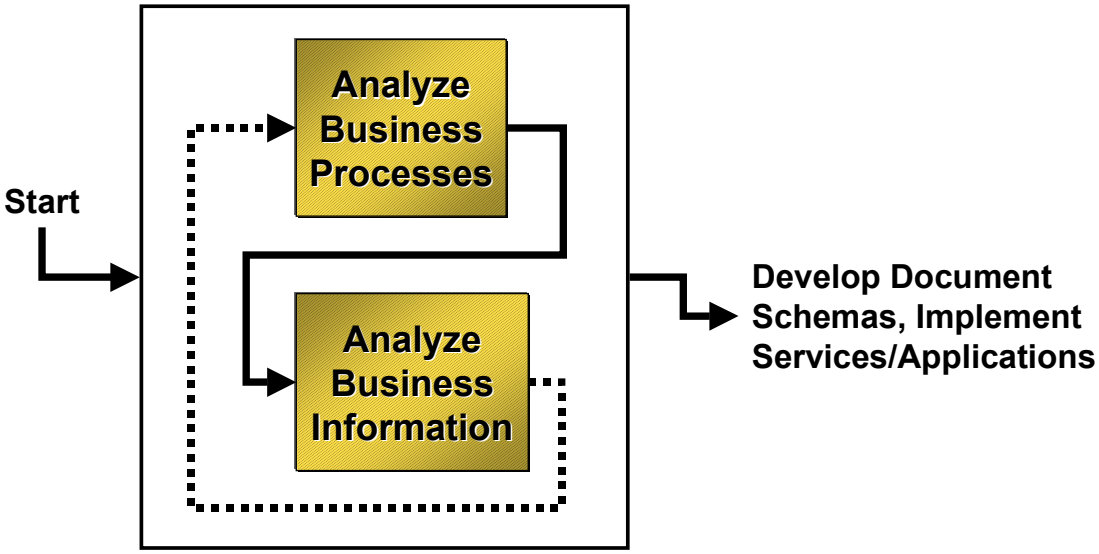


Figure 8.4-3, Analyze Business Process and Business Information Activities

The overall analysis process will generally be more effective if the analysis of the business processes and associated business information happens at the same time. Business information analysts will need to be familiar with the business process and will want to be co-participants during the business process analysis. Otherwise, the business information analysts MAY need to re-interview domain experts, customers, and partners, to get clarification on matters that could have been more effectively addressed during the analysis of the business process. Furthermore, business information analysts will likely have the background that will help identify the key business information elements that effect the business processes.

The analyze business processes activity can proceed along different paths depending on the focus of the modeling effort. For example, if the goal is to establish a business reference model for an industry, the process will likely proceed as discussed in the UMM, from the beginning to the end of the UMM documentation. However, if the effort is to model existing X12 or EDIFACT documents and their associated business processes, the process will more naturally start with the elaboration of business transaction and roles. In this case, there is usually a strong implicit understanding of the associated business process by domain experts. Business process analysis can be partitioned into four high-level activities[9] as shown in Figure 8.4-4:

[9] It is recognized that the analyze business process activity may be partitioned in different ways to suit the sensibilities of the participants in the analysis process.

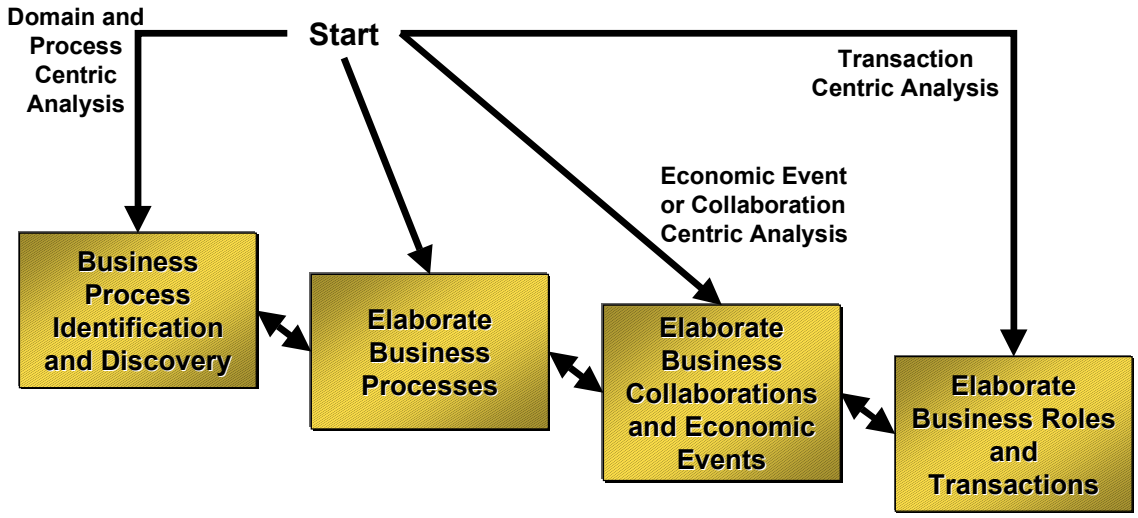


Figure 8.4-4, Analyze Business Process Activities

Once the business process and business information analysis is complete, the next activities are the Develop Schemas activity and the Implement Services activity. Development of schemas involved the creation of the document and information component schemas (XML schema/DTD or EDI message and data element definitions) and sample documents. Implementing the service/application involves coding or configuring business service interfaces and services/applications (such as back-end systems) in accordance to the business process definitions and the document schemas.

Once the analysis is complete and the business processes and documents have been full defined and developed, the specifications SHOULD be registered in a Business Library [TAS]. A Business Library is a repository of business process specifications and business information objects within an industry or shared by multiple industries. There will be many business libraries, pubic and private, controlled and not controlled. A public library is one that is available for public access. Typically the content of these will be owned by standard's efforts, such as ebXML and UN/EDIFACT, and large electronic communities (such as automotive marketplaces). A private library is one that does not have public access. These are for private exchanges where the participating parties do not wish to disclose the nature of their business processes. Obviously, the public access business libraries will be the most useful in promoting interoperability between trading partners in different electronic communities. For example, it may be necessary for the e-business systems of a trading partner in the automotive community to access business processes registered in a chemical community.

A controlled business library is one whose content is administered by some organization, such as standards body or electronic community. Business process and business information specifications WILL be submitted to a working group or other supervising activity for the controlled business library. The working group WILL review the submissions for quality and accuracy. The specifications MAY be put to public or community voting for approval. Approved specifications are then registered in the business library. At such time, key model elements - such as Business Process, Business Collaboration, and Business Transaction - are officially assigned their identifiers according to the Business Identifier Naming Scheme [BPAWAG]. These identifiers facilitate re-use and interoperability by providing unique identifiers that can be referenced by business process specifications, Core Component's contextual categories, CPPs and CPAs. Controlled business libraries will typically have more credibility than ones that are not controlled. A business library that is not controlled will allow anyone in the community to register specifications. The quality and

accuracy of the specifications will be suspect. However, these type of libraries could result in significant business process specifications. Business process specifications that get significant usage will be recognized over time.

The format in which these specifications are stored is an important consideration, as the key to an enterprise's ability to utilize these specifications in their analysis process is that they are stored in a format that is interoperable with business modeling tools. It would appear RDF offers the opportunity to encapsulate business process models during the analysis, design and 'record for posterity' stage in business process life cycles. In addition, the use of RDF will also help achieve one of the original goals of UN/CEFACT for ebXML, which was assuring that model specifications could be interexchanged between standards organizations, so as to further promote business process modeling globally and to promote reuse of common solutions. The advantage of RDF over other formats such as XMI is that RDF can be restricted by use of namespaces to a specific problem domain, whereas others typically conform to the more general UML domain. The ability to express a metastructure in RDF and validate it means better control on the applicability of model content. When using models in a constricted domain like B2B, it is attractive to be able to validate model content according to a metastructure. From a business information standpoint, It is particularly useful that RDF allows association to BusinessAction elements, i.e., placing a message in the context of a business process.

A summary of the entire analysis effort and its results is shown in Figure 8.4-5 below:

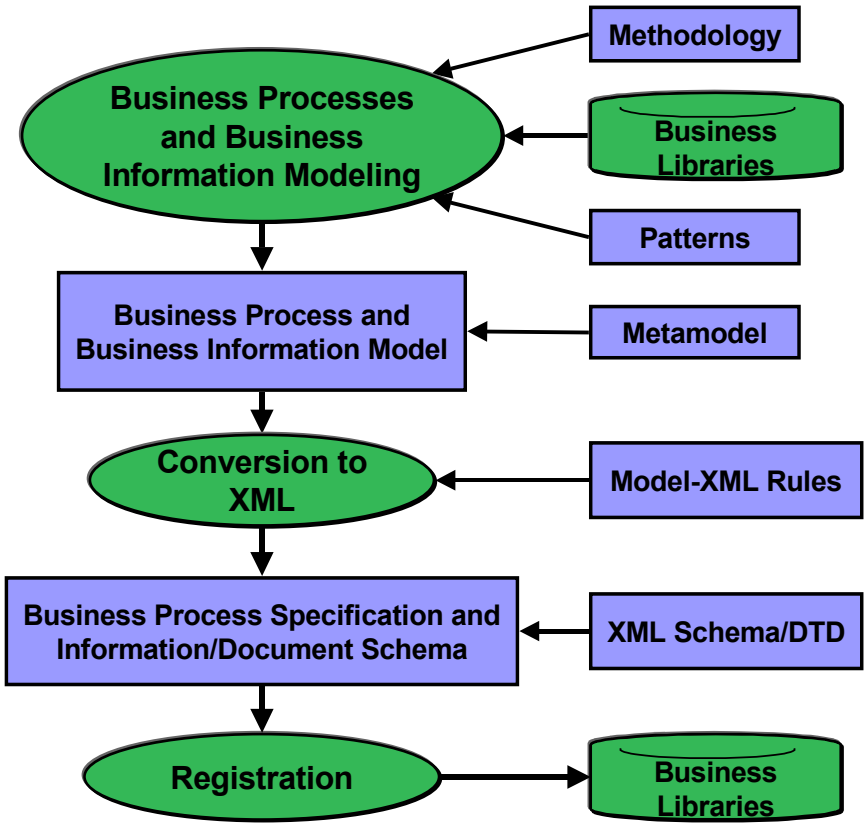


Figure 8.4-5, Modeling, Conversion to XML, and Registration Activity Flow

The overall effort starts with the analysis and modeling of business processes and business information. The UMM Methodology can be employed directly or indirectly through the use of the Business Processs Analysis Worksheets or business process editors. Re-usable business process

and information components from Business Libraries are applied, as well as collaboration and transaction patterns. The analysis effort results in business process models and business information models that are based on the Metamodel. The models are then converted into XML based Business Process Specifications and Information/Document schemas according to a set of production rules. The specifications and schemas are then registered and stored in Business Libraries for re-use and reference by CPAs.

9 Relationship Between Business Process and Core Components

9.1 Introduction

As previously stated, business process models define how business processes are described and represent the “verbs” of electronic business. Information models define reusable components that can be applied in a standard way within a business context. Core Components and domain components represent the “nouns and adjectives” of electronic business. They are defined using identity items that are common across all businesses. This enables users to define data that is meaningful to their businesses while also maintaining interoperability with other business applications.

9.2 Business Information Objects

Business Information Objects MAY be composed of Core Components, domain components, and other business information objects. The component and business information object definitions are stored in business libraries. Core Components can be stored in the specially named Core Library. Business document definitions are constructed of business information objects, domain components and Core Components. The following steps describe how to develop business document definitions.

1. Search Business Library for required attributes available in business information objects.

2. If business information objects with appropriate attributes are not available, new business information objects must be created.

3. Domain components in the business libraries and core components in the Core Library COULD be candidates for business information object attributes, assuming the context is appropriate.

4. Add the new attributes to existing business information objects, or introduce new business information objects through a registration process that manages changes to the Business Library.

5. Use the new attributes, now in the Business Library, to create the business documents.

In summary, the primary sources for creating business documents in a business process and information model, are business information objects in a Business Library. The secondary sources are domain components in business libraries and the core components in the Core Library, when appropriate business information objects cannot be found. Until the Business Library is constructed, or imported from a credible sources, core components are likely to be utilized frequently, first to add to the repertoire of business information objects in the Business Library, and second, to create business documents.

9.3 Core Components Analysis

The *ebXML Methodology for the Discovery and Analysis of Core Components* describes the process for identifying information components that are re-usable across industries (hence the term "core components"). Core components are used to construct domain components and business information objects. Business libraries, which contain libraries of business process specifications (such as the *ebXML Catalog of Common Business Processes*) are instrumental in the discovery and analysis of core components and domain components.

The business process specifications contain values that describe the contextual use of core components and the elements within core components. This is discussed further in Section 9.4, Core Component Contextual Classification. Business library cross-references, such as the cross-reference in the *ebXML Catalog of Common Business Processes*, assist the core component analysis effort by identifying related business processes, transactions, and documents from various standards such as be EDIFACT, X12, xCBL, RosettaNet, CII, and OAG.

9.4 Core Component Contextual Classification

The *Metamodel* specifies the information to be captured when modeling a business process. The model contains a number of elements and attributes that are considered to be significant in effecting the interrelated conditions of the other elements in business process and document models. It is useful to understand this contextual dependency between the various model elements during the analysis process. Furthermore, in the future, it MAY be possible to apply these contextual dependencies at runtime[10].

The contextual dependency concept – referred to as simply "Context" – has been given in-depth consideration by the ebXML Core Components Project Team as it has a significant role in the analysis of reusable information components. When a business process is taking place, the context in which it is taking place can be specified by a set of contextual categories and their associated values. For example, if an auto manufacturer is purchasing paint from a chemical manufacturer, the context values might be as follows:

Contextual Category	Value
Process	Procurement
Product Classification	Paint
Region	U.S.
Industry (buyer)	Automotive
Industry (seller)	Chemical

Figure 9.4-1, Example Context Values

[10] For further discussion on this topic with respect to document elements (core components), see *ebXML The role of context in the re-usability of Core Components and Business Processes*.

The contextual categories, identified in *"The role of context in the re-usability of Core Components and Business Processes"* simply map to existing elements and attributes within a business process model that is conformant to the UMM Business Process Metamodel. For example, the contextual Category "Process" maps to the Metamodel elements BusinessProcess, ProcessArea, and BusinessArea. A mapping of Context Categories to Metamodel elements is provided in Appendix A.

9.5 Context and Common Business Processes

The role of Context with respect to business process models has not been formally addressed by ebXML as it is out of scope for the ebXML effort. However, it is generally accepted that common business process models can be extended or constrained based on their contextual usage. For example, business process X could have constrained (or extended) behavior XY if the industry is "Automotive" and constrained (or extended) behavior XX if the industry is "Retail." The context of the business process is defined by the values of such modeling elements such as business area, process area, industry, role, and, perhaps, the economic events and resources. This is analogous to the concept of Context as it applies to core components and document specification. Refer to *ebXML The role of context in the re-usability of Core Components and Business Processes* for more information on Context and core components.

10 Analysis Aids: Worksheets and Tools

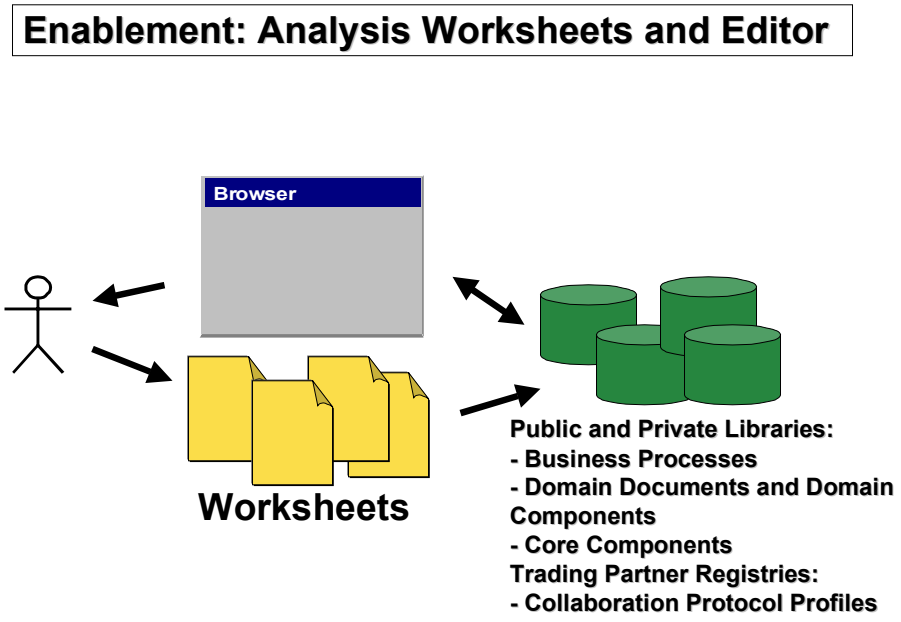
People without the expertise in analysis and modeling will likely find that the UMM will be useful as a reference manual. These people will use UMM complaint approaches or, even, alternative methodologies during the analysis of business processes. Practical experience tells us that it will be more useful to the electronic business community to have an approach that does not require such analysis and modeling expertise. An approach that a business person can apply would be most useful. *The Business Process Analysis Worksheets and Guidelines* provide such an approach.

10.1 Analysis Worksheets and Guidelines

The ebXML Business Process Analysis Worksheets [BPAWAG] are a set of business process analysis design aids to be used with the UMM as a reference. The Worksheets allow users to capture all the information that is required to completely describe a business process. This description can be used to drive software, and can be registered, classified, discovered and reused.

It is intended that the Worksheets be used in conjunction with a browser that lets the user search business libraries (registries/repositories containing catalogs of business process specifications) for items that have already been defined. This is shown in

Figure 10.1-1. The items (e.g. business processes, business collaborations, document schemas, etc.) can be referenced (re-used as is) or copied to the worksheets and changed as needed. Over time, business process libraries will become populated with a sufficiently large number of business processes. When this happens, the analysis process will often be a simple matter of validating



pre-defined business processes against requirements.

Figure 10.1-1, Business Process Analysis Worksheets Usage

10.2 Business Process Editor and Document Editor

Business Process Editors and Document & Component Editors are the electronic versions of Business Process Analysis Worksheets. They provide an effective means for business process and information modeling since they can connect directly to business libraries and trading partner directories. See Figure 10.2-1.The tools will support discovery, user friendly forms-based modeling, business process and business information comparison, documentation and help on the analysis process, and capabilities for submitting specifications to controllers of the business libraries. Tool suites of business process editors, document & component editors, and CPP/CPA editors will be instrumental in enabling ebXML based e-commerce.

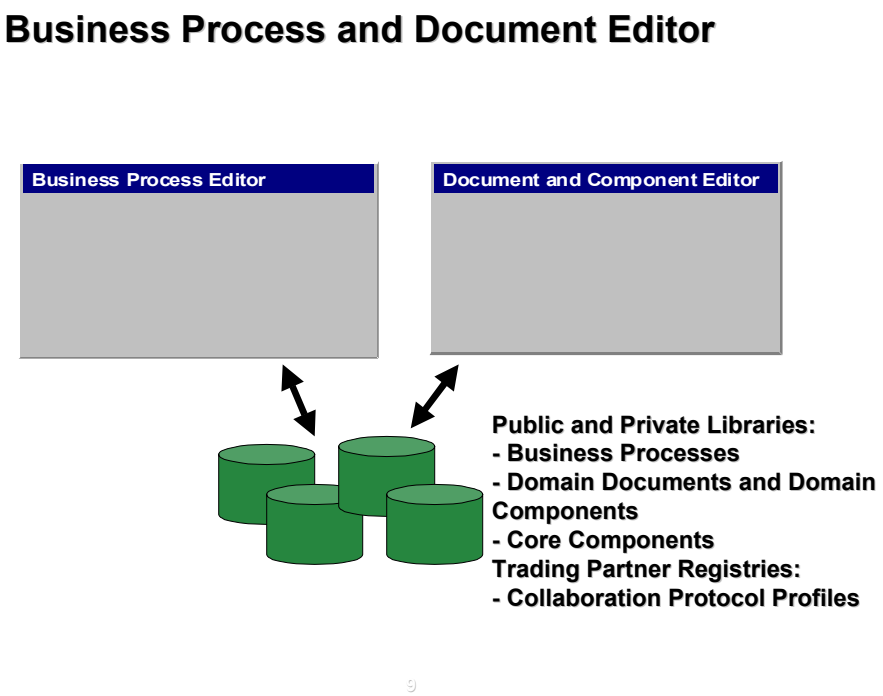


Figure 10.2-1, Tool Interaction

Business Process Editors and Document & Component Editors are the electronic versions of Business Process Analysis Worksheets. They provide an effective means for business process and information modeling since they can connect directly to business libraries and trading partner directories. See Figure 10.2.1. The tools will support discovery, user friendly forms-based modeling, business process and business information comparison, documentation and help on the analysis process, and capabilities for submitting specifications to controllers of the business libraries. Tool suites of business process editors, document & component editors, and CPP/CPA editors will be instrumental in enabling ebXML based e-commerce.

11 Glossary

Term	Definition	Source
Business Information Object		
Business Library	A repository of business process specifications and business information objects within an industry, and of common business process specifications and common business information objects that are shared by multiple industries.	[TAS]
Business Process		
Business Service Interface	A service that exposes an interface for one or more rules in an ebXML collaboration. Also referred to as Business Service.	
Business Transaction	A set of business information and business signal exchanges between two business partners that must occur in an agreed format, sequence and time period.	[UMM]

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13 Disclaimer

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

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Appendix A Context Category – Metamodel Cross-reference

The following table cross-references Core Component's contextual categories with Metamodel elements.

Contextual Category	Definition	Metamodel Element	Sources of Resources	Comments
Industry	The industry or sub-industry in which the information exchange takes place.	BusinessOperationalMap.industry	UN/CEFACT, etc.	Hierarchical values The BOM provides a logical categorization of a set of processes, these processes may be organized in more than one way (scheme) or from more than one view including industry. Domain and industry are not the same: an industry is a type of domain which is not necessarily industry specific.
Business Process	The business process enabled by the information exchange.	BusinessProcess	*ebXML Catalog of Common Business Processes* UN Industry Classes RosettaNet BPAWG (UN/Cefact process group) Business Process patterns	Hierarchical values. Cross-enterprise situations can be accommodated since Business Processes are defined in context of Trading Partner Types. Multiple values in a single context category is permitted.
Product	The goods or services that the exchange of information describes or enables	EconomicResource	UN/SPCP General Classifications from the UN and general classifications from domains.	Hierarchical values. Use standard classifications or define your own. The Metamodel permits this. It is likely that various industry forums will define these. The kind of product influences the kind of product information.
Physical	The physical	Geographic	GPS,	Hierarchical values.

Contextual Category	Definition	Metamodel Element	Sources of Resources	Comments
Geography /Conditions /Region	geography and conditions (weather, altitude, climate) geographical context of the information exchange (not geo-political)	and regional categorization may be defined by the category schema in the BOM.	Aerospace, ISO	Range of conditions are specified as constraints on the category element.
Temporal	The time-based context of the information exchange	EconomicCommitment.due	It is a conditional expression that may be evaluated against a multiplicity of criteria.	Not hierarchical. This can be a range of dates.
Geo-Political Legislative/ Regulatory/ Cultural	Political Rules (usually defined by Geography) and Regulatory Organizations which are used. NOTE: External influence to business conversation	Geopolitical and regulatory categorization may be defined by the category schema in the BOM.	ATA, DOD, FAA, AECMA, UN/Cefact. ISO	Hierarchical values - stop at high level (province, state or city level) - do not specify body of regulation.
Application Processing	The application and/or system context of the information exchange There is some agreed-upon level of support.	Business Service	UN economic activity and/or OAG: this is hierarchical. (Applications within applications). - *Broad* definition of "application". Self-registered by external bodies.	Supports vendor and industry sub-standards values.
Business Purpose /Domain	A business purpose context unrelated to the business	BOM		Business Purpose and domain may be defined and scoped by the BOM categorization schema.

Contextual Category	Definition	Metamodel Element	Sources of Resources	Comments
	process. This is the "purpose" of the recipient(s) of the business information.			
Partner Role	Particular role that a party plays in a process.	Partner Role		Non-hierarchical. Is it defined in commercial collaboration
Service Level (profiles – not preferences.)	Service level attached to agreements of either the provider or receiver of products.	Agreement	OTA, Credit agencies	Hierarchical.
Virtual marketplace	An environment in which to do business	Marketplace categorization may be defined by the category schema in the BOM.		A market place and community are synonymous.
Info. Structural Context	[The "element" context of information in an XML sense]	Business Document, InformationEntity	Self-referential, may be hierarchical.	
Contracts/ Agreements		Agreement, EconomicContract.		

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