



Creating A Single Global Electronic Market

ebXML Methodology for the Discovery and Analysis of Core Components

ebXML Core Components

February 16, 2001

Version 1.01

1 Status of this Document

This document specifies an ebXML working draft (FOR APPROVAL) by the eBusiness community.

Distribution of this document is unlimited.

The document formatting is based on the Internet Society's Standard RFC format.

This version:

ebXML Methodology for the Discovery and Analysis of Core Components
Version 1.01

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4 Introduction

4.1 Summary of Contents of Document

Historically, the definition and analysis process for electronic business standards has been much more of an “art” rather than “science”, leading to inconsistent philosophies and results. ebXML makes extensive use of new technologies, techniques and best practices to ensure a scientific approach produces predictable results.

Information included in this specification defines the methodology for that approach, detailing discovery and analysis of common components and processes involved in the interchange of business information.

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].

4.2 Audience

The target audiences for this document include business domain experts and technical experts. This document describes how to identify common information components and processes for the use in ebXML.

4.3 Related Documents

Related documents provide detailed definitions of technical approaches such as Unified Modelling Language, (UML).

- Methodology for describing Core Components (WG7rev04)
- ebXML Core Component Naming Conventions (ebXML Naming conventions for Core Components and Business Processes Ver1.01)

5 Design Objectives

This document describes how Business Processes should be reviewed to derive their Core Components, including the impact of context.

The objective is to provide guidance for the discovery and analysis of Core Components and common Business Processes used in the interchange of business information.

5.1 Caveats and Assumptions

This document is dependent upon tools and developments available at the time of its writing. It is expected that there will be rapid development of new applications and tools which will facilitate the discovery and analysis of components and processes used in the interchange of business information.

It is expected that the discovery method, as described in this document will soon be replaced by a more automated process. The instructions in this document may clarify for teaching and learning purposes how to determine those business information processes and components that will comprise an ebXML compliant interchange.

6 Overview

This is a general description of how to identify Core Components from the registry. Then analyse Core Components and common Business Processes within any given business domain for the purpose of interchange opportunities using XML.

6.1 Detailing Discovery and Analysis?

Finding Core Components and Business Processes together with their context either through searching the ebXML registry(ies) or by means of self-discovery processes that result in the description of an information interchange in electronic business.

This guide includes the following:

- Steps for finding business process libraries of components and examples of information interchange already existing in an ebXML-compliant Registry (see table section 7).
- Steps for identifying common and industry-unique processes and components that are not yet included in an ebXML-compliant Registry. (see table section 7).
- Cross-references to tools for performing discovery and analysis such as modelling techniques and methodologies.
- The analysis process which is to be conducted by a cross industry group.

7 Discovery Process Instructions

Step 1

Identify and document the types of processes needed.

Examples:

“The procurement processes between the automotive industry and the oil suppliers.”

“The claim notification processes between a transport company and an insurance company.”

Step 2

Go to an ebXML-compliant Registry to do a “search” to find the business process libraries of components and examples of information interchanges already existing.

Note: The URL and specific processes for doing this will be determined at a later time. It is not available at the time of this writing.

Step 3

176 If unable to find information in an ebXML-compliant Registry, continue with the
 177 following steps.

178

179 **Note:**

180

181 The basic “pieces” needed for either a hard copy document or electronic interchange
 182 include:

183

- 184 • Business Process descriptions
- 185 • Core Component descriptions
- 186 • Those items that add contextual meaning to both or either of the Business Process
 187 and any Core Components

188

189 The table documents process-relevant information at different levels:

190

- 191 • Catalogue of Common Business Processes with cross references
- 192 • Core Component Analysis

193

194

Step 1 State the types of processes needed.

Examples:

“The business process interchange procurement documents between the automotive industry and the oil supplier.”

“The business interchange of a claim notification between a transport company and an insurance company.”

This column is assuming that there is no matching process on the Business Process table, both lists are available BUT there is no associating mechanism	This column is assuming that there is a matching process on the Business Process table, both lists are available and there IS an associating mechanism	Create Component(s) because lists are not available or because no matching items have been found	Create the Business Process because neither lists are available
A	B	C	D

<p>Step 2 Check the sources of documents listed on the Business Process Catalog to identify a document that may have all of the information that is needed (these may be EDIFACT, X12, xCBL -Extensible Common Business Language, Rosetta Net PIP -Partner Interface Process, CII, OAG-Open Applications Group, BOD). There may be an existing form or document which is familiar and/or similar and could be reviewed.</p> <p>Result: Similar items that may meet requirements are found.</p>	<p>Step 2 Locate the components associated with the process that fits the requirements.</p> <p>Results: If they do match go to Step 3 otherwise go to the set of instructions in this table "Create the Business Process" in Column D</p>	<p>Step 2 List the Component(s) following the headings on the table. Read the descriptions of the headings and examples for guidance</p>	<p>Step 2 List the steps in the business process that you are trying to accomplish or one that is close to what you need to interchange in any of the "contexts" that may exist.</p>
<p>Step 3 Look for matches from the sample document(s) of information types on the ebXML component list.</p> <p>Result: Matches are found</p>	<p>Step 3 Each information component needs to be reviewed to see if it fits the requirements for the process. (Meaning does the component definition match the requirements?) Result: Either matches are found or if not go to the set of instructions in this table "Create the Components" in Column C</p>	<p>Step 3 These instructions will be in a separate section to be determined at a later time.</p>	<p>Step 3 Find a similar business process</p>
<p>Step 4 Each information component needs to be reviewed to see if it fits the requirements for the process. (Meaning does the component definition match the requirements?)</p> <p>Result: If they do not fit go to the set of instructions "Create Components" in Column C.</p>			<p>Step 4 Compare the "kinds of information" that exist for the business process that has been found such as – buyer, seller, shipping, equipment, date of delivery, date of shipping, time, location with the known requirements</p>

8 Analysis Process

8.1 Philosophy

Electronic Commerce message designers have long struggled with the difficulty of striking a balance between semantically explicit messages for use between trading partner pairs, and the flexibility needed when trading partners are from different industries

Solving this problem requires achieving a balance between structure and semantics, which results in *concise* business document specifications based on *use* between trading partner pairs. This approach leads to message specifications, which are fully documented and complete without the need for further specification such as implementation guides.

8.2 Relationship between the ebXML Discovery and Analysis Processes

The ebXML Discovery and Analysis processes are as follows:

- The discovery process as detailed in the earlier sections, is to assist domain experts (within the following domains finance, transport, travel, materials management) in expressing requirements. This process involves the collection of business process requirements, information requirements and the context within which these requirements apply. For example, the typical order might include a buyer, seller, product/quantity details, payment and shipping. However, if the product involves hazardous materials, this determines the need to provide additional information. Additionally, different geographic regions have different reporting requirements for hazardous materials.
- The role of the analysis group is to ensure that the information requirements discovered by the domain teams are met with a semantically concise solution, which is structured in a harmonised manner to support the ebXML *cross industry* interoperability goals.

8.3 Core Versus Extension

This body of work represents a substantial innovation in the structuring and managing of eBusiness semantic information. The ebXML Core Library contains fundamental and reusable building blocks for use in multiple contexts. The Core Library components include Business Processes, Collaborations, Roles, and information entities. The Core Library establishes a framework for reuse both by its organisation structure and by its contents. An extension methodology is used to expand the ebXML Core Library by means of adding context specific processes or components.

8.4 ebXML Analysis Scope

1. Contexts

The designated set of categories, as specified in 'ebXML The role of context in the re-usability of Core Components and Business Processes'

- 1.1. Collaborations Process Models [refer to 'Analysis Overview: Business Process to Business Documents']
- 1.2. Roles
- 1.3. Business Documents

2. Information models

- 2.1. Functional Sets
- 2.2. Aggregate Information Entity
- 2.3. Basic Information Entity

8.5 Aggregate Information

Aggregates are basic building blocks. An aggregate is a set of related data elements whose characteristics define a single distinct concept (e.g. a party, a place, a product, a service, etc.).

Aggregates should be developed to meet the functional definition by including the most efficient reuse of basic Core Components independent from context.

One of the purposes of the aggregate definition is to describe the concept that is represented at a certain level of abstraction(s). The level of abstraction is derived to achieve maximum reuse and interoperability.

Aggregates are based on other Components creating building blocks.

Rule 01: The basic information entity identifies a single unit of data whose characteristics are entirely defined by its specification within the Initial Catalogue of Core Components Ver1.0.

Rule 02: The basic information entity within an *aggregate* shall relate directly to the purpose of the *aggregate*.

Rule 03: A *data element* within an *aggregate* shall be specified with a *status*.

8.6 Functional Set

Functional sets are used to group functionally equivalent aggregates. Functional Sets differ from Aggregate Information Entities in one fundamental way. The parent child relationship between the Functional Set and the children, Basic Information Entities or Aggregate Information Entities, represents a decision point where the children are functionally equal and therefore mutually exclusive.

9 Appendix - Application of the Analysis Methodology

9.1 Background

The purpose of this document is to illustrate use of the ebXML Core Component Analysis process. In order to demonstrate the analysis process, we need to construct an example. Fortunately, this work is able to draw from some work going on in X12 that is representative of the complexity, yet is of a small enough size to be useful in an example.

The chosen Domain area is **vital records, death registry**.

9.2 Objectives

The objectives for the final ebXML usage must accomplish the following goals;

- Explicit: the resulting specification provides enough semantic information such that the parties understand at a level of detail sufficient to relate the information to their application database
- Concise: the resulting specification is sufficiently precise that it expresses exactly what is required in order to conduct this business process, for the express usage intended.
- Interoperability: This is a comment on structure and reusability. This ranges from technology/tools, applications, and information specifications.

9.3 Example

9.3.1 Death Registry - Introduction

What follows is a simplified representation of the process and information requirements for the registration of a decedent in a death registry. In the United States, vital statistics are managed at the state level, and state laws dictate details of how this process is carried out and what information is required.

Basically, this process involves an authorized requester, typically a funeral director, who is licensed to request the registration of a decedent. The authorized requester interacts with the State level registration authority, and supplies detailed information about the decedent. Once all required information about the decedent is collected, a death certificate is issued. Subsequent to this, qualified organizations can inquire about the decedent. These inquiries are of two forms, a conformation that the decedent is registered or detailed information regarding the circumstances of the death.

There are two major external beneficiaries of the information collected in this process, the Center for Disease Control, and the Social Security Administration. These outside agencies, and the subsequent inquiry reporting are outside of this analysis process, but maybe useful for future Collaboration analysis.

Activity model for registering a decedent (figure 1).

Death Registration Process

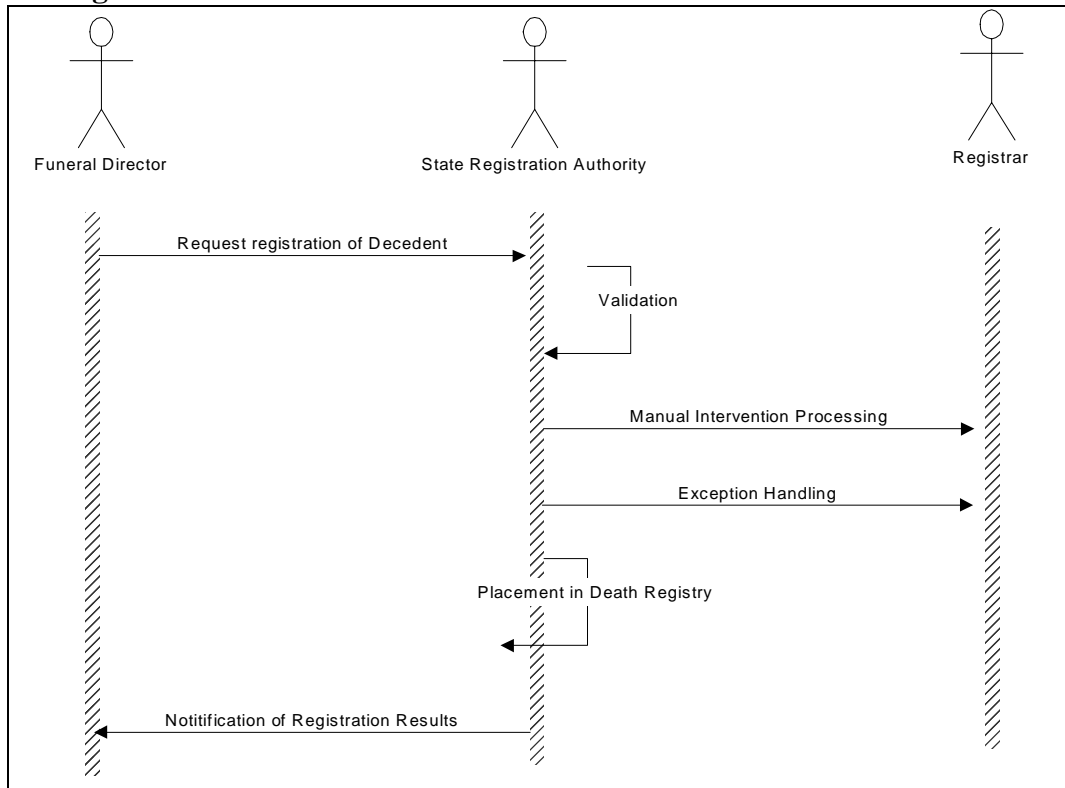


Figure 1

9.3.2 Information Models

In the Registration Request Business Document in this business collaboration, there are three primary information components: Registrar/State, Requester/Funeral Director, and the decedent. The first two, the role players, are of such similar information requirements that they are both shown in Registration. Below are the information models for: The Funeral Director [Requester] and the Decedent.

The Registrar/State

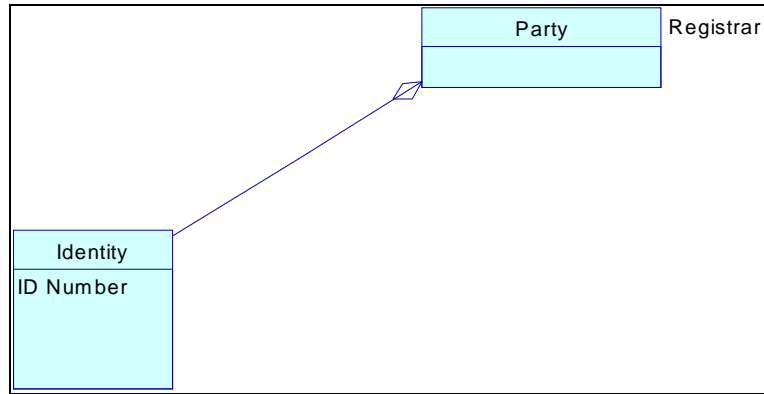


Figure 2

The Requester/Funeral Director

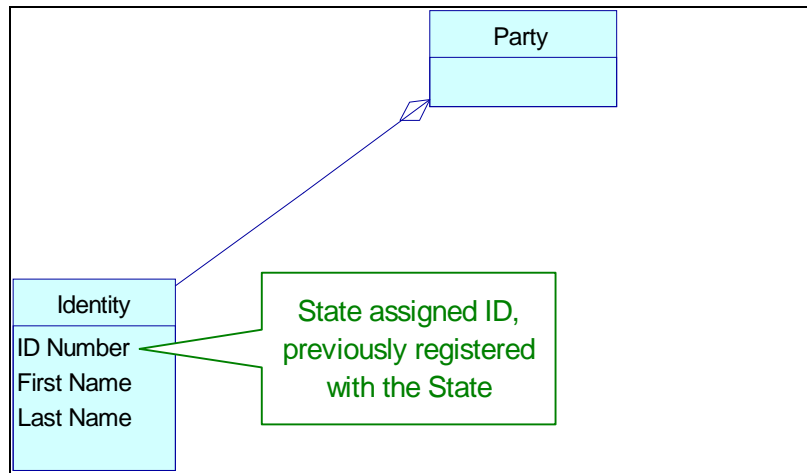
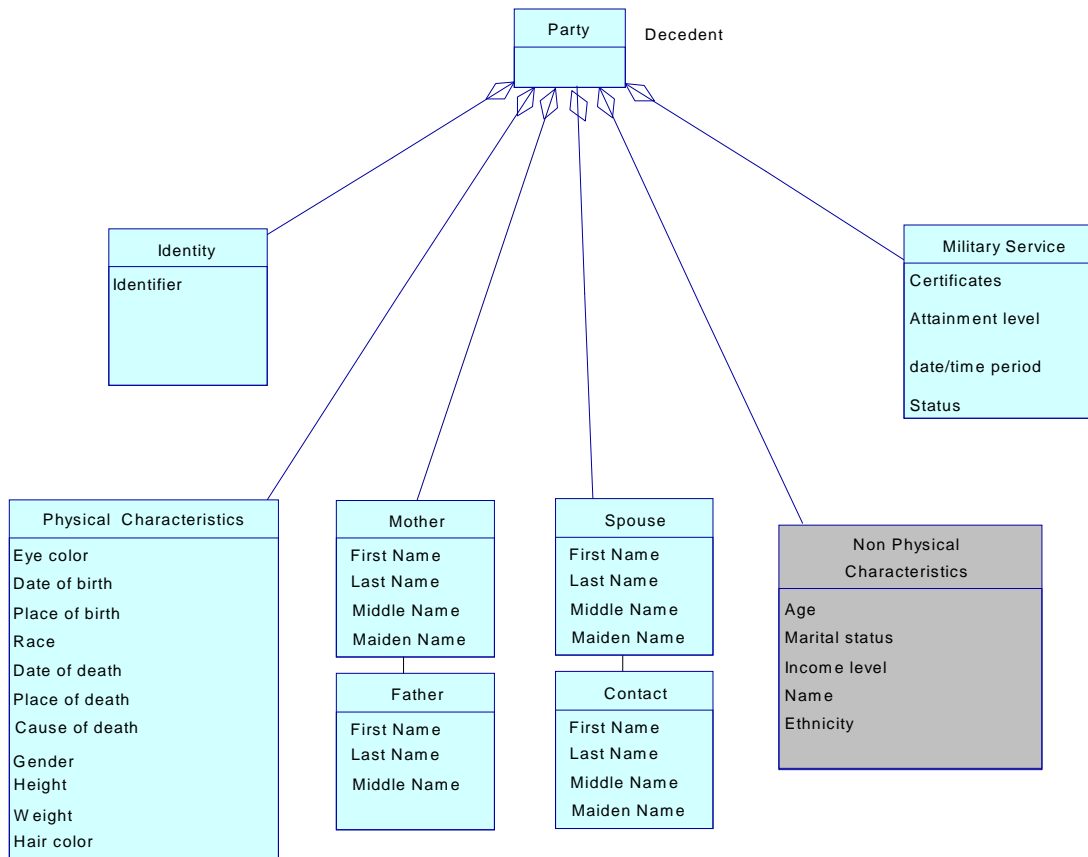


Figure 3

341

The Decedent Information Model



342

Figure 4

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9.4 Analysis

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9.4.1 Scope

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349 Before proceeding, it is important to identify our overall objectives and which of these
350 objectives is addressed by each decision.

351

9.4.2 Objectives

352

- 353 • Ensure that the information requirements expressed by the domain teams are met with
- 354 semantically concise and explicit solutions
- 355 • Design to meet cross industry interoperability goals
- 356 • Evolve the CC Core Framework to facilitate interoperable development

357

9.4.3 Historical problems to avoid

The only way to establish a relationship is with hierarchy. Historically, hierarchy is used to express relationships, which results in structure creep. Everything, regardless of how or why it is related, gets folded into the same structure.

- Relationship
- Cardinality

9.4.3.1 We tend to overload messages

- The only aspect of context managed in today's EDI world is available at the message level. This results in business documents, depending on how generic, which contain anything, anyone would need for any potential purpose the document can be used.
- Consider alternative structures, short of messages.

9.4.3.2 I have a hammer, it must be a nail

- the tendency is to not look for alternative approaches

9.4.3.3 Syntax versus semantics.

- Generating a list of all semantic elements leads to a unmanageable proliferation of data elements, and is a barrier to interoperability.
- At the opposite end of the spectrum, all information could be described with a couple of qualifiers, making syntax simple. However, this approach has the same damaging side effects as the other approach, only creating endless lists of codes, instead.
- There is a sweet-spot between these two approaches which balances the need to express semantics with the need for structural simplicity, which we are demonstrated in this document.

9.4.3.4 Analysis approach.

In conducting this analysis, the approach draws upon other subject areas outside of the information technology world, which parallel aspects of this subject. Detailed below are these parallel areas of interest and how they apply.

- Natural language: Selected because of the obvious similarities in objectives, the ability to communicate information. It is fully recognized that the scope of natural language is far larger than our needs for business communication, but the close parallels make it an excellent reference model. The grammatical properties of natural language provide an excellent model for examining abstractions and document construction.
- Parts Management/Bills-of-materials: From a standpoint of naming and reuse objectives, it is clear that naming and structuring data elements and naming and structuring parts are closely related.

9.4.3.5 Analysis Steps

- Start at the information level, utilize grammar as an aid to:
 - Identify logical grouping
 - Examine connection needs between logical groupings

- Consider syntactic constructs, keeping in mind semantics
- Look at structure versus interoperability
- Work upward to the Business Process
- Experiment with different levels of abstraction
- Examine the relative tradeoffs

9.4.3.6 Analysis of Information Models

The analysis involves the 3 information models involving parties, figures 2-4. Two of these information models depict descriptive information about parties which are individual persons, in varying levels of detail. The other information models also describe parties, which are organizations.

9.4.3.6.1 Grammar.

If we were to construct a basic sentence describing the Death Registration process, we would have,

The funeral director registers the decedent with the state.

The funeral director/requester is the subject, the verb registers has the direct object decedent and an indirect object state/registrar. This view provides some insight into the information requirements on actors/role players. The Requestor is the subject, and the second actor, the registrar, is the indirect object of the verb.

- Indirect Object. When you consider grammatical usage, the information burden on these actors is minimal, which makes sense when you consider their role in the process. They are contacted, asked to perform authentication functions, and then accept a registration request – issue a registration certificate. Therefore, information requirements placed on the indirect object is for enough information so that the registrar can determine that they are the intended receiver. The two examples selected for this analysis have parties, which are organizations, as the indirect objects.

Abstracting one more level, business communications involve an indirect object role player, and the information burden on this description is limited to identification. There are cases where additional information is supplied, but this is not the typical case and is probably based on historical needs, what has traditionally appeared on paper documents.

- Subject. The information requirements for the subject role type is similar to that of the Indirect Object. Enough details must be supplied to 1) identify the party, and 2) to verify that the party is authorized to perform the function. This additional burden, authenticating the party, makes it confusing to specify ‘identification’ details. From a core component perspective, it appears that a variety of details are required to identify the party. In practice, the information required for identification is small, and stable. Information required to authenticate a person can include date of

birth, social security number, name, mother's maiden name, etc.
Authenticating an organization has a similar predictable list.

Abstracting one more level of generalization, the subject role type has variability in the information requirements for the subject role type, based primarily on three primary factors: information required to authenticate the party for the role, information required for subsequent business activities, and historical business practices.

This approach is very illuminating when you consider some situations where a single party is both a role player and the direct object, as is the case when a student registers self for classes. In this case, a single individual is both the subject and direct object. So, the descriptive needs placed on 'self' includes both those descriptors for the subject role player, and the details need for the student direct object.

- Direct object. Now, expanding this basic sentence to include all of the details required for the death registration business document is shown in the sentence diagram shown in figure 9, using natural language grammar.

Decedent Registration Sentence Diagram

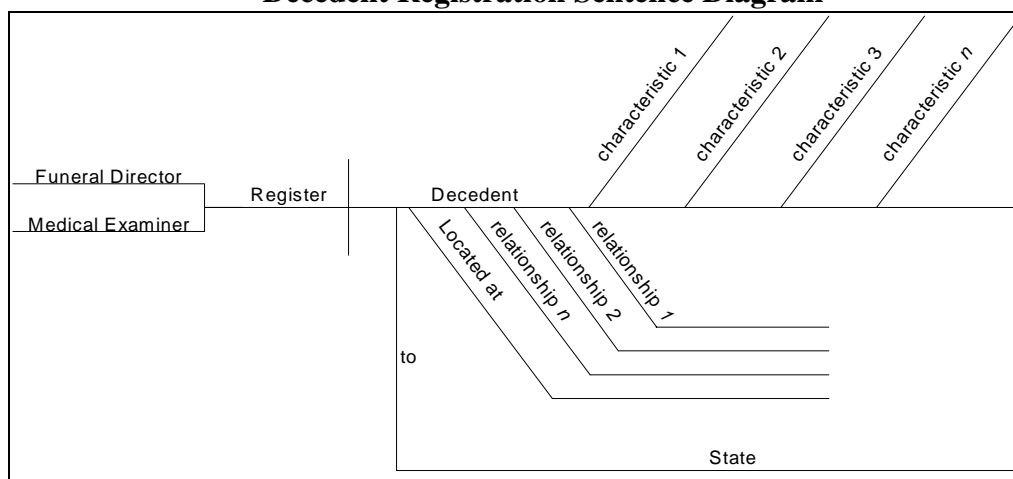


Figure 5

Our goal is to determine how to logically group and relate the information associated with the decedent.

Grammar gives us a logical syntax for analyzing the descriptive information about our decedent. Please note, there is a lot of functionality that grammar provides, including: artistic presentation of thoughts, well structured

sentences, proper tenses, etc. These are outside of our scope. We are looking to grammar for two fundamental things, determining logical groupings, and how to connect. In grammar, you have two types of words. Content words include nouns, adjectives, verbs and adverbs. Structure words are determiners, prepositions, pronouns and conjunctions. Structure word are closed classes, they are finite, not added to. Content classes admit new members.

Step 1, locate the adjectives. In the upper right portion of our sentence diagram is for adjectives. The nice thing about adjectives is there is an easy test to determine whether something is an adjective, can you put it in front of the noun in the noun phrase. Ok, our decedent is the noun, so the noun phrase has to be “the _____ decedent”. In Figure 6, we have a lengthy list of candidate adjectives to test each. In order to test each one, we can take a value for each one and try placing it into the noun phrase.

a) Identifier

The 12 decedent,

The 12 ID decedent

It is clear that the identifier is not an adjective.

b) Eye Color

“the blue eyed decedent”

That works, eye color does describe a decedent.

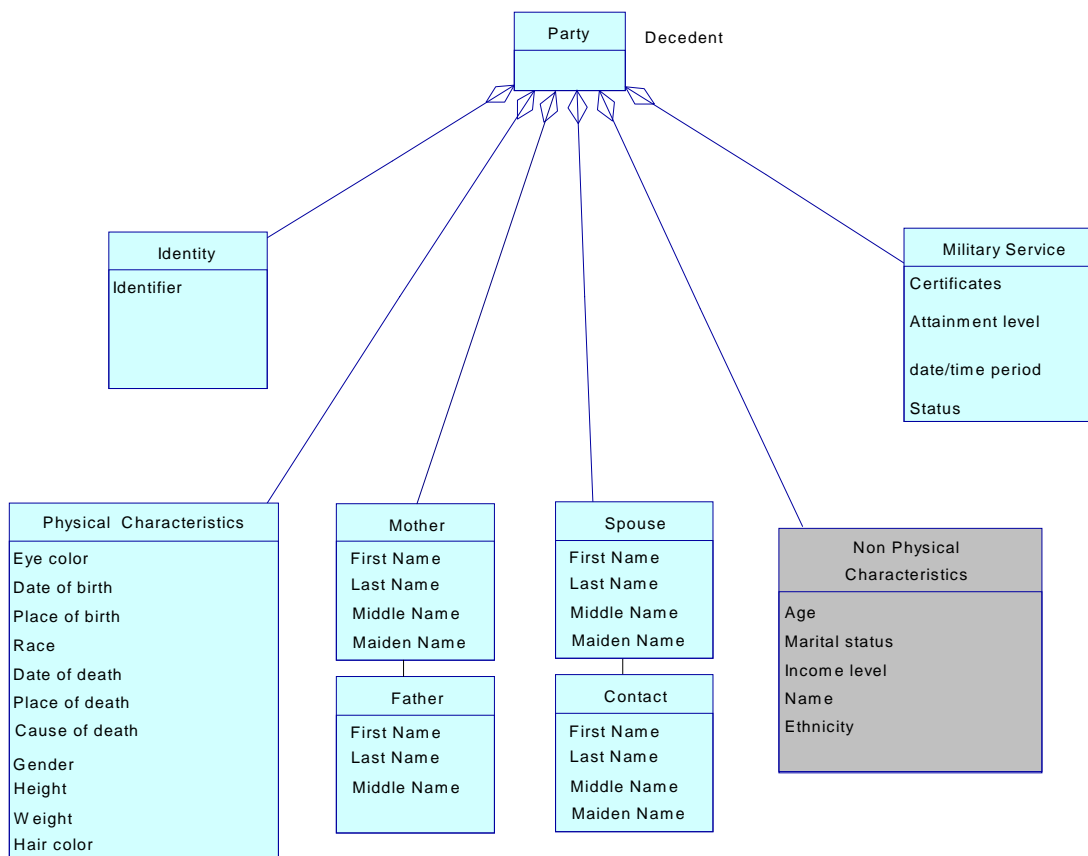


Figure 7

Figure 7 shows the adjectives found in bold, which account for about 1/3 of the decedent party information model. Those descriptors remaining are not adjectives, so they do not modify the noun decedent.

Step 2, locate those descriptors which are associated with a connector.

Those that are not adjectives might be associated through a connector, which examination of the remaining identifiers yields some clues. We have a place and date of birth, and we have a place, date and cause of death.

These are actually descriptions of events, which happened to the party.

Further, there is military service information to, which has date, time, and status information as well. These noun phrases are associated with the predicate and linked with a connector.

These particular ones all fall into a general category of **event**. Events have a date/time and type. Typically, there will be a place/location for events that happen to people. Experience is a special kind of event. In general, experiences differ from events, in that there is an attainment level and status, and the in place of the date/time, is a time interval. There may be a certificate. There are two kinds of experiences, immutable and mutable.

Immutable experiences are irrevocable, they are. I took a scuba certification dive from Oct 6-7, 1995 and was granted certification, as a level 1 diver. In contrast, mutable experiences are point in time. I took a certification dive from Oct 6-7, 1995 and was granted a certification from Oct 7, 1995 – Oct 7, 2000. Mutable experiences must have certificates, and those certificates must have a date/time interval or a status.

Mother, father, spouse and contact.

It is typical in Business Documents to have other parties, which are not actors in the business process, such as witnesses, relatives, contacts, etc. The fundamental question here is whether they are related to the event or the party (decendent).

In this example, the mother, father and spouse are literally related to the decendent, by definition. They are associated with the decendent, through a connector, and from a grammatical perspective, are objects of a prepositional phrase.

Unlike the other parties, the contact is associated with the registration process itself.

Name and ID

These are the means by which to identify a specific decendent, and from a grammar standpoint, decendent becomes the adjective when used with the name or ID of the specific decendent.

9.5 Analysis Conclusions

Simple grammatical constructs have yielded a small set of categorizations for the core components. These categories are Party/Person/Organization <short dash outline>, Events <solid outline>, and Characteristics <long dash outline>, shown in figure 8.

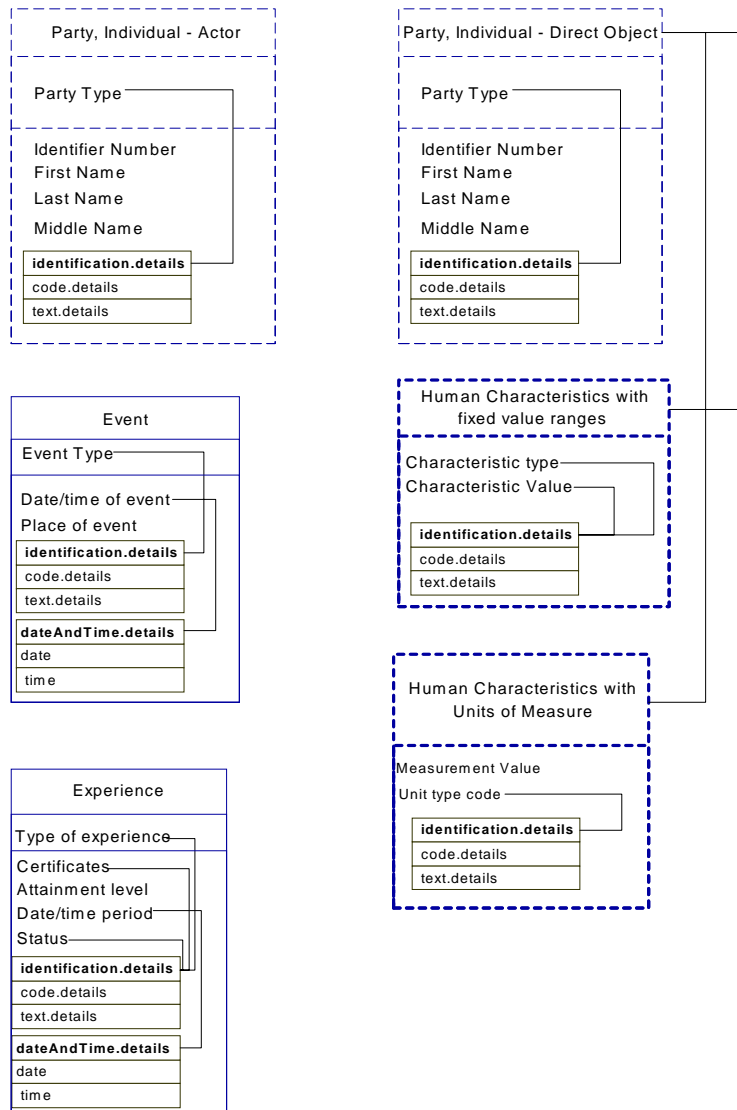


Figure 8

This is the first of such classifications, which will aid in the long term interoperability and maintenance objectives. Others to follow will include Location/Place and Product. Further, note that our Direct Object Party, has characteristics directly associated. It is commonly known that events and other parties can be associated with the party, but which events or parties to associate is context dependent. Thus, the decedent information requirements, depicted in figure 4, recast according to the core components, are handled as shown in figure 9.

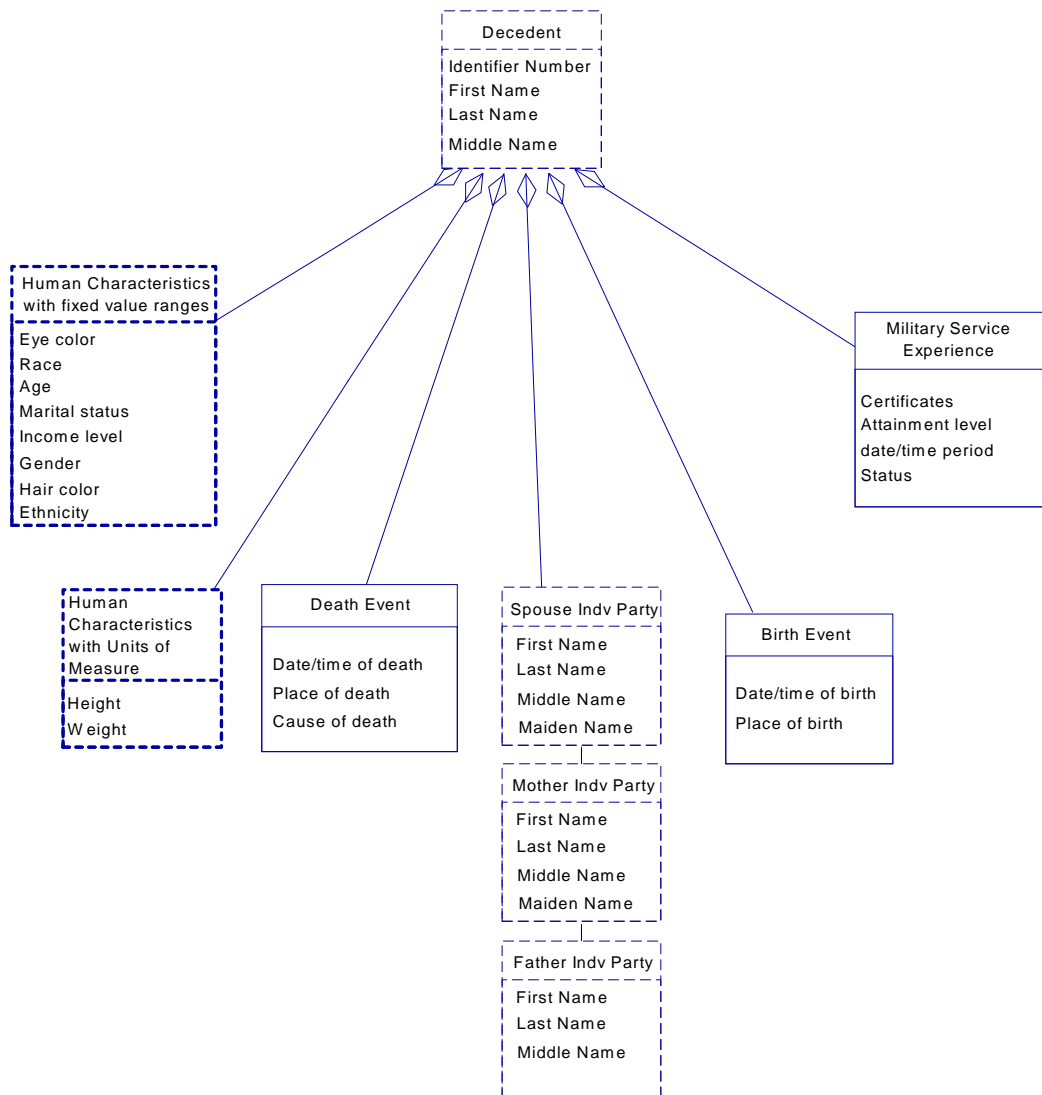


Figure 9

10 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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611 To be defined