



Creating A Single Global Electronic Market

ebXML Methodology: Core Components Discovery and Analysis

ebXML Core Components

March 23, 2001

Version 1.02

1 Status of this Document

This document specifies an ebXML (FOR APPROVAL STANDARD) for the eBusiness community.

Distribution of this document is unlimited.

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

This version

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2 ebXML participants

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4 Introduction

4.1 Summary of Contents of Document

The information included in this document provides guidance for the discovery the discovery and analysis of common components and processes involved in the interchange of business information.

4.2 Audience

The target audience for this document includes business staff of both an information technical background and specific business focus area. This document describes how to identify common information components and processes for use in ebXML.

4.3 Related Documents

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

Document Identification	Document Name	Source (URL) on Internet
ebXML Glossary		
Methodology for describing Core Components (including Appendix.zip)	WG7rev04.doc	http://www.ebxml.org/working/project_teams/Core_Components/
ebXML CC Naming Conventions	ebXML Naming Conventions for Core Components	http://www.ebxml.org/working/project_teams/Core_Components/latest.htm
Analysis Overview: Business Process to Business Documents		

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 that will facilitate the discovery and analysis of components and processes used in the interchange of business information.

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/Objective

This document assists users in the discovery, analysis and documentation of common Business Processes and Core Components that are used in information exchange. The results of these activities will then be compared against entries found in public repositories. This comparison will result in either creating new or updating existing entries within the repository.

7 Discovery and Analysis

Discovery and Analysis consists of finding Core Components and Business Processes together with their context either by means of research and analysis of business requirements or via searching the ebXML Repository (ies).

This guide describes the following:

- Documentation of the business and data requirements.
- Finding business processes and their components already existing in an ebXML-compliant Repository. It is anticipated this process will soon be enhanced by the availability of automated tools.
- Identification of business processes and their components not yet included in an ebXML-compliant Repository. The procedure for submission is not covered in this document.

The ebXML Discovery and Analysis activities are as follow:

- The description of the discovery activity is to assist domain experts [finance, transport, travel, materials management, etc.] in expressing requirements. This activity involves the collection of business process requirements, information requirements and the context within which these requirements exist. For example, the typical order might include a buyer, seller, product/quantity details, payment and shipping. However, if the product involves hazardous materials, different geographic regions may require different information.
- The role of the analysis group is to ensure that the information requirements discovered through the Discovery process are met with a semantically concise solution, which is structured in a harmonized manner to support the ebXML cross industry interoperability goals.

7.1 *Discovery Activity Instructions*

The following steps demonstrate the discovery process using ‘manual’ techniques rather than automated tools. Users familiar with the business process and business data requirements should perform this activity. Initially, new users should follow these steps in order to fully understand the discovery activity. After that, the use of automated tools is recommended in order to have more consistent, uniform results.

- Step 1. Concisely describe the business process/exchange. Describe the business process at a level of detail sufficient to identify the business information that is required.
- Step 2. Draw a model of the business exchange by breaking it into logical groupings of like business information (families).
- Step 3. Name each logical group (family).
- Step 4. Take each family and break it down into smaller logical units
- Step 5. Write down each detail item. Those that can be further broken down are Aggregate Core Components.
- Step 6. Continue doing this until you reach the lowest business entity (Basic Core Components)

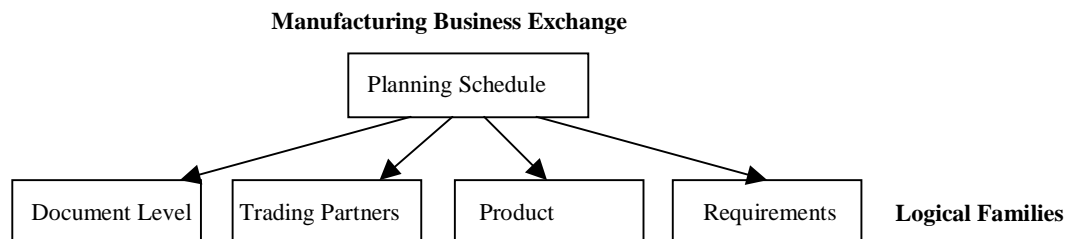
A SIMPLE EXAMPLE

- Step 1. Concisely describe the business process/exchange.

Example: “A manufacturer wants to send a supplier his requirements for a certain product.”

Then describe the business process at a level of detail sufficient to identify the business information that is required.

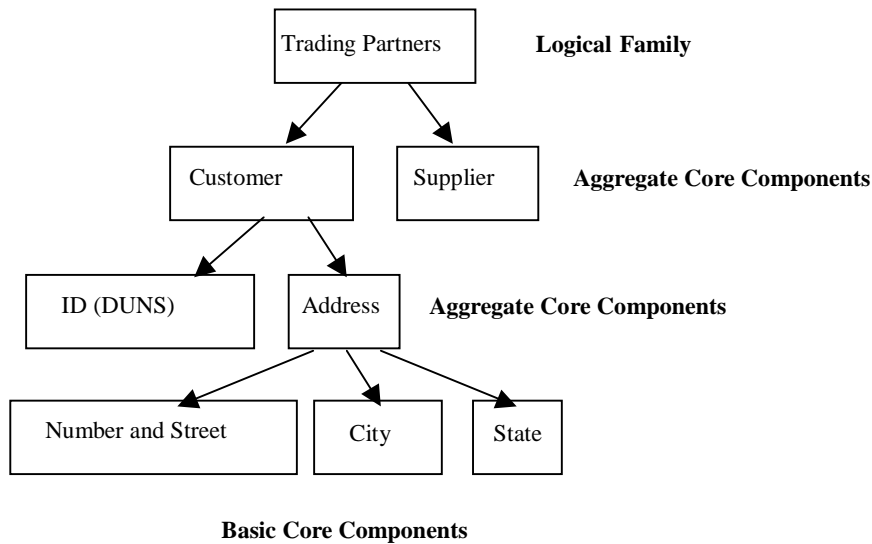
Step 2 Draw a model of the business exchange by breaking it into logical groupings of business information (families). Use any known techniques such as data modelling, story boarding, free text, etc.



Step 3. Name each logical group (family)

Family Names: Document Level: Meaning, where in the business process does this document occur?
Trading Partners
Product Details
Requirements

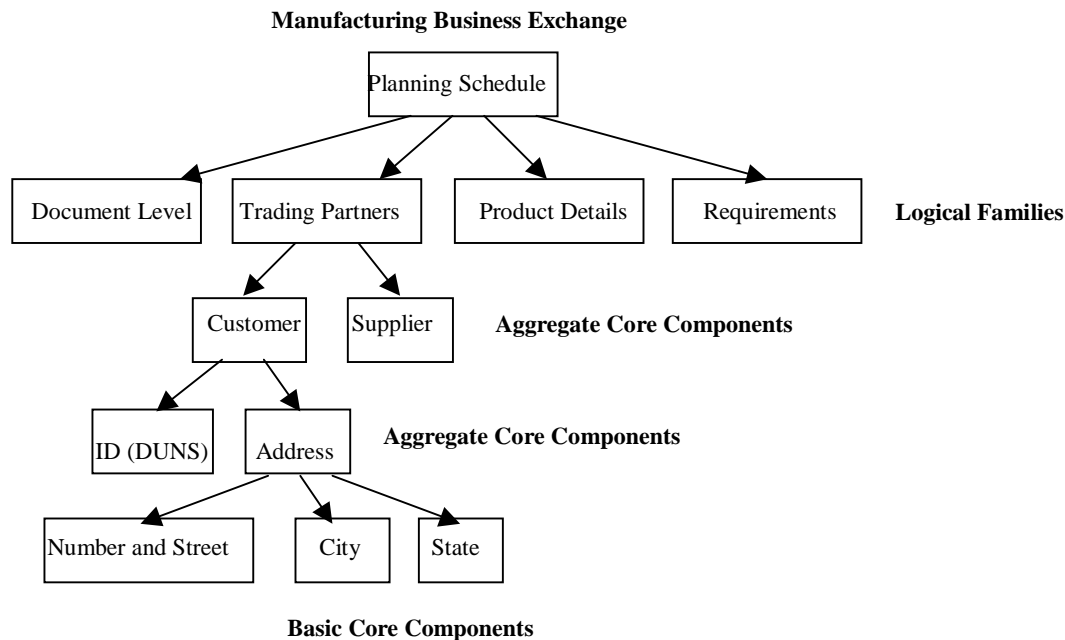
Step 4. Take each family and break it down into more detail



Step 5. Write down each detail item. Those that can be further broken down are Aggregate Core Components (see Section 8).

Customer is an Aggregate Core Component, since it can be broken down into a DUNS number and an address. Address is also an Aggregate, since it also can be broken down into lower levels.

Step 6. Continue this iterative process until you reach the lowest level that cannot logically be broken down further (Basic Core Components)



7.1.1 Finding Existing Business Processes and Components

Search within an ebXML-compliant Repository for similar business processes and components.

Assumptions:

- **An ebXML-compliant Repository of Business Process models (in UMM) is in place**
- **An ebXML-compliant Repository of Core Components is in place**
- **A UN/CEFACT domain-neutral analysis team has been formed**

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

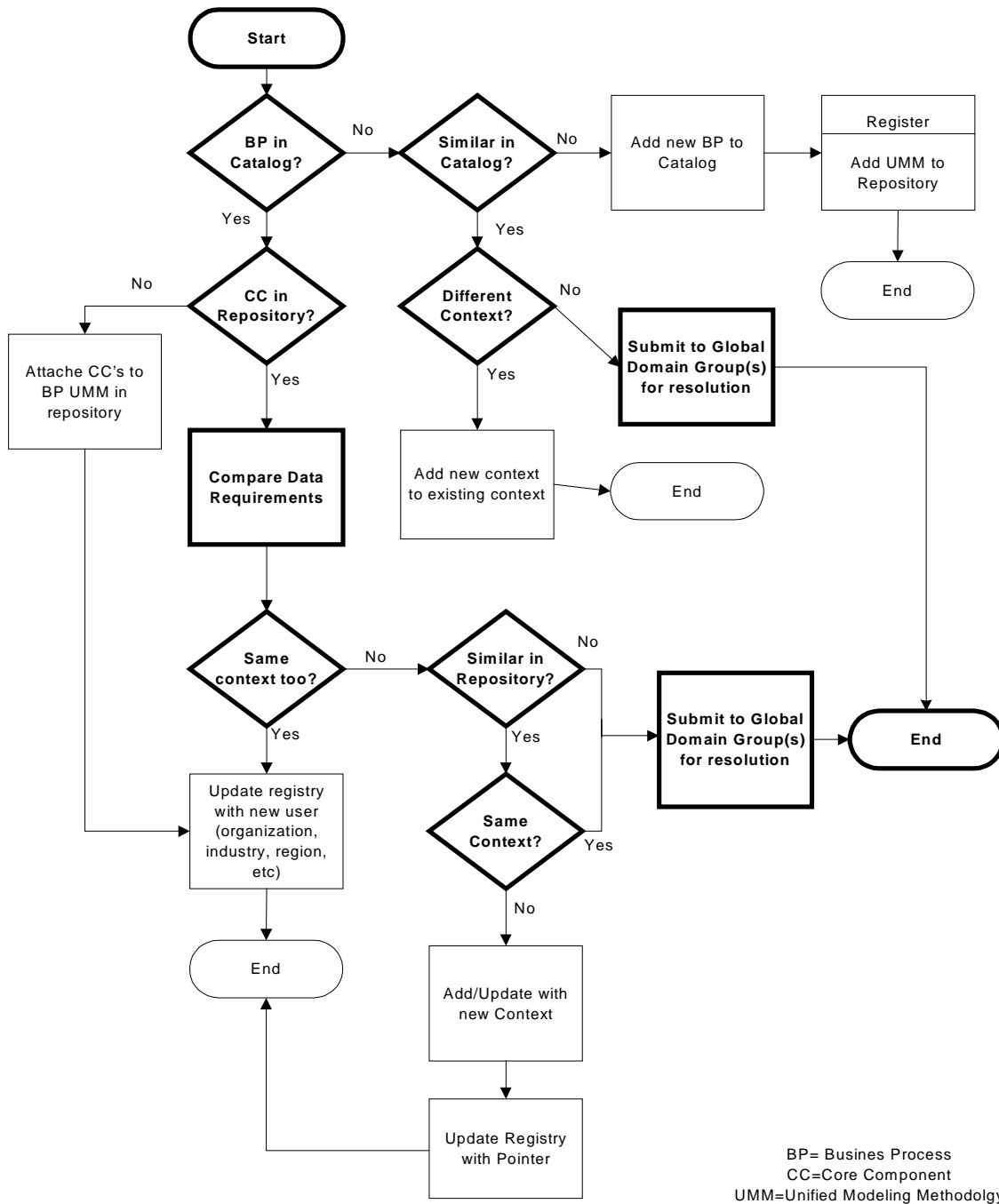
The following flowchart diagram illustrates the different decision paths to take if the discovery activity is able, or unable, to find existing business processes and components.

It is assumed that there will be officially recognised domain-specific methods responsible for the resolution of any domain-specific conflicts.

It is also assumed that there will be an authorised domain-neutral analysis process to which requests for the addition of new, or updates to existing, repository information can be passed for approval.

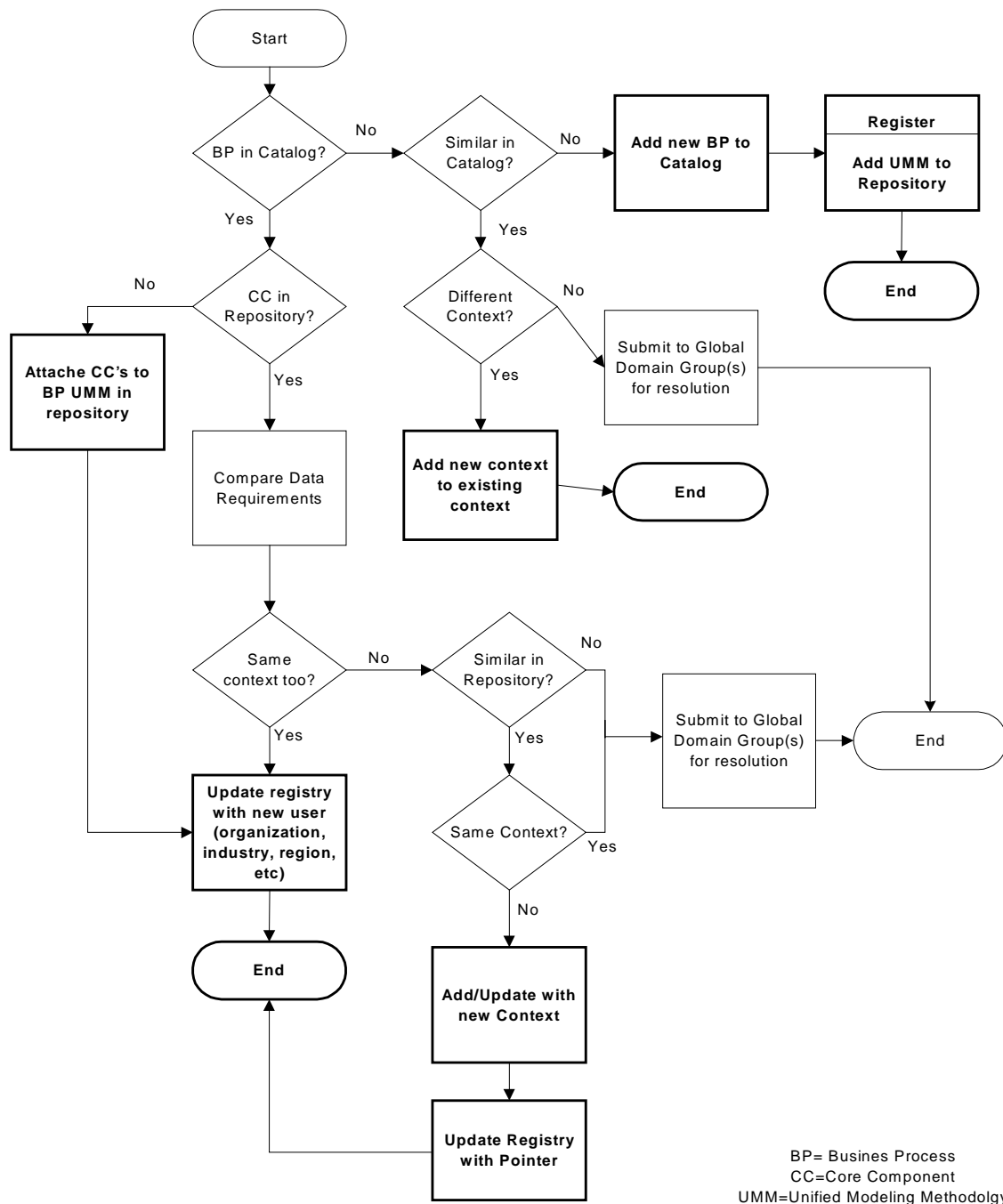
In the flowchart, Discovery activities are shown in emphasised (bold) boxes.

Discovery Activity



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Analysis Decision Making Process



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8 Analysis Activity

The authorised domain-neutral analysis process will accept requests for the addition of new, or updates to existing, repository information. This process carries out an impact and implication analysis of the request leading to approval or negotiation.

In the following version of the flowchart, the Analysis activities are shown in emphasised (bold) boxes.

8.1 Ground Rules for Constructing & Validating Core Components

Prior to establishing ground rules, it's necessary to define the meaning of the concept « core component »:

A core component is a basic building block for the creation of a semantically correct information exchange parcel. It is atomic in its fundamental construct. It contains only the essential information pieces necessary to describe the concept in a non-contextual manner.

A core component can have two natures, “general” that basically can be used across several business sectors and “domain specific” that is, in principle, only used within the domain in question.

The ground rules are principally aimed at the “general” core components, but they may be applied to the “domain specific” core components with perhaps some slight modification.

In order to demonstrate the ground rules, two core components have been selected from the current examples in the ebXML catalogue. They are :

1. **Time details** (*The time within a (not specified) day.*), which is composed of time (*The time within a (not specified) day.*), time format text (*The format of a time.*), time zone offset count (*The offset between the specified time and Greenwich Mean Time (GMT) (also known as Universal Coordinated Time (UCT))*), and date adjustment count (*An adjustment to the date.*).
2. **Communication number details** (*The information for one communication number or virtual address.*), which is composed of communication environment (*The environment of the communication point.*), communication mode (*The way or manner in which the communication is made.*), communication security (*The security protocol of the communication mode.*), communication identifier (*The number or virtual address of communication.*),

communication availability (*The part of the day or week that the party is reachable by the communication means.*), telephone country identifier (*The telephone identifier for a country.*), telephone area identifier (*The telephone identifier for a geographical area within a country.*), telephone subscriber identifier (*The telephone identifier for a subscriber within a geographical area.*), and telephone extension identifier (*A subsidiary telephone with it's own additional number as an extension of a subscriber identifier.*).

Both of these core components can bring to light a number of issues that can help us identify the ground rules necessary for the establishment of core components. The resulting harmonised core components can satisfy both the cross industry requirement and provide the basic building blocks for the creation of semantically correct information packages.

Ground rule 1: All the attributes within a class should be totally dependent upon the main subject matter within it and uniquely complement its information requirements (A simplified version of Codd's normalisation requirements 3NF).

Example: The core component time details contains the attribute "date adjustment count" which, as its definition indicates, does not contribute uniquely to the notion of time. It bears no direct relation to the main subject matter of the core component. In fact the definition implies that it is an adjustment to the date and therefore that somehow there is associated with the time a date. This is a contextual piece of information that requires other exterior classes to be known before it can become semantically comprehensible. It could be used in the context of travel timetables, where there is a day, a departure time and an arrival time. In this context when the date of departure is known it would be possible to determine correctly the date of arrival and the time on the day in question. It can therefore be seen that the attribute in question is used to establish date information rather than to enrich the concept of time.

In the core component communication number details, the attribute communication security is clearly not directly associated with the main subject matter "communication number" that is defined as "the information for one communication number or virtual address". It is more importantly associated with the communication carried out over the line rather than the number. E.g. anyone can dial a telephone number or connect to a web site, but its only once the initial connection has been made that the security protocol kicks in.

Ground rule 2: The population of the objects within the class should be all of the same fundamental nature, and it must be possible to individualise each member of the population. This ensures that the identifying characteristic of the class is clearly established. Cases can be envisaged where the population set within the class, whilst all satisfying the population definition, may be subdivided into more fine-grained subsets. If this is the case then a categorisation attribute shall be associated with the class. In this context, subsets of subsets should not be allowed and in this case different classes shall be created.

Example: In the core component time details (assuming correction and elimination of non compliant attributes) the population of the time is the hours, minutes, seconds etc.. which make up a 24 hour day. In a similar vein the date can consist of the total population of all possible dates. In the case of the date, however, it could be possible to have several

subsets that could represent the different calendars that exist (Gregorian, Julian, Jewish, Chinese, etc...). If this were the case then it would be necessary to add a categorisation attribute to distinguish between the different subsets.

In the core component “communication number details” the population consists of a set of electronic addresses, be they telephone numbers, telex numbers, or URLs. It is clear in this case all the addresses are used to establish a communication liaison, however these can be subdivided into the nature of the communication mode such as telephone, telex, fax, etc.

Cases can be made to provide separate classes for each of the subsets. However cases can be made to generalise the class where the population has a finite set of sub classes.

Ground rule 3: Wherever possible, the representation of the identifying information in a class should use a recognised unique standard.

Example: In the case of the “time details” class the representation should reference ISO 8601 that provides a unique and unambiguous manner to specify time. This includes the specification of UTC and the offset to identify local time. In this case the need to identify within the core component the representation type (time format text”) and the UTC offset would no longer be relevant.

Ground rule 4: A class cannot exist without any attributes.

Example: The core component “date and time details” contains no attributes and consequently should not exist.

Ground rule 5: The association of several classes together to form a more complex generalised and non contextual class should be carried out only when it had been clearly established that there were no contextual constraints which would disable any of the associations.

Example: The core component “account details” has a unilateral association with “charge details” and “interest details”. However, these associations cannot systematically be employed as, depending on the context, the association may be present or absent. It is therefore preferable to leave the individual core components apart. The associations will consequently only be established when the information package is created within the particular business case.

9 Example

9.1 *Death Registry - Introduction*

The example is based on 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

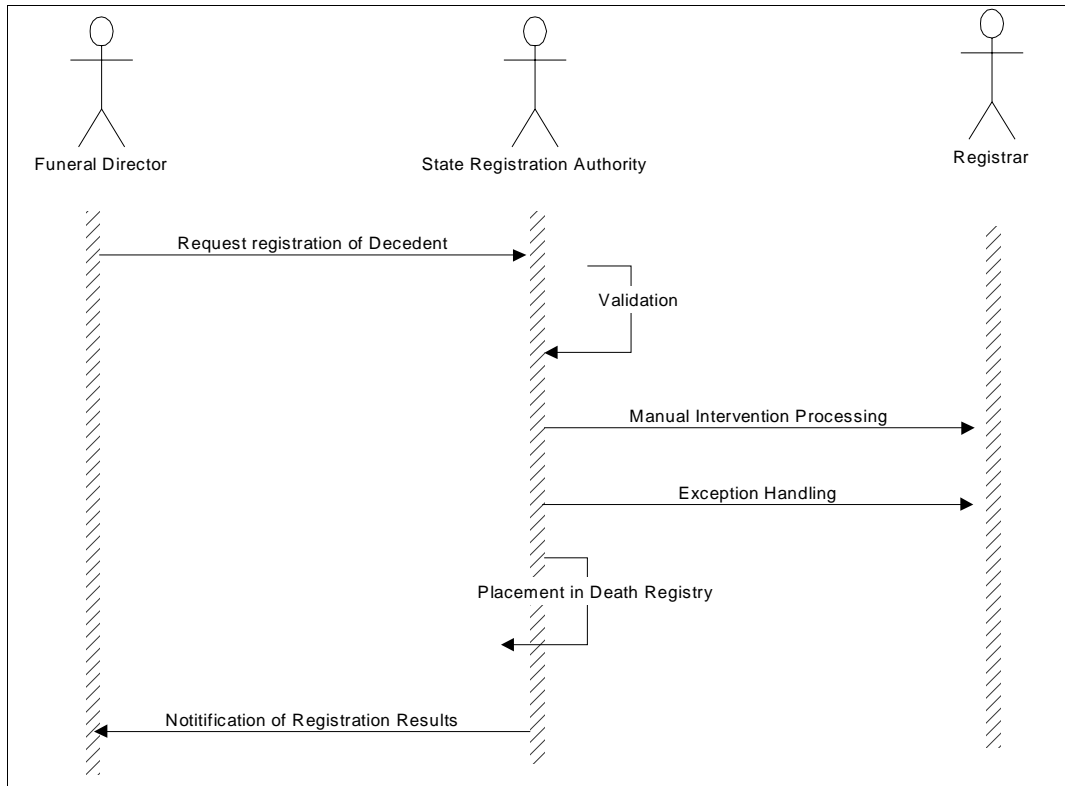


Figure 1

9.1.1 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

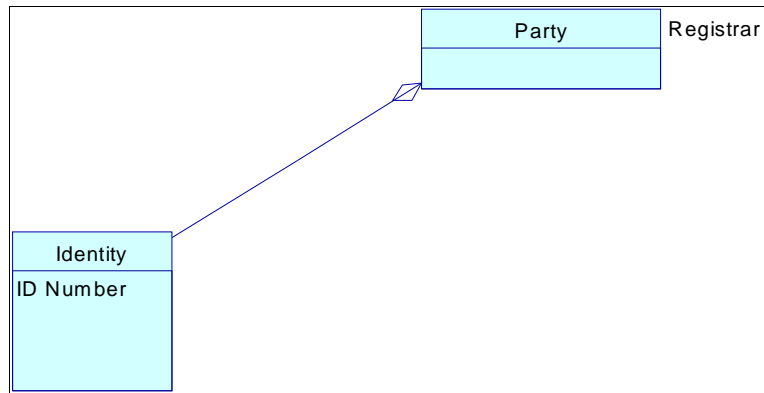


Figure 2

The Requester/Funeral Director

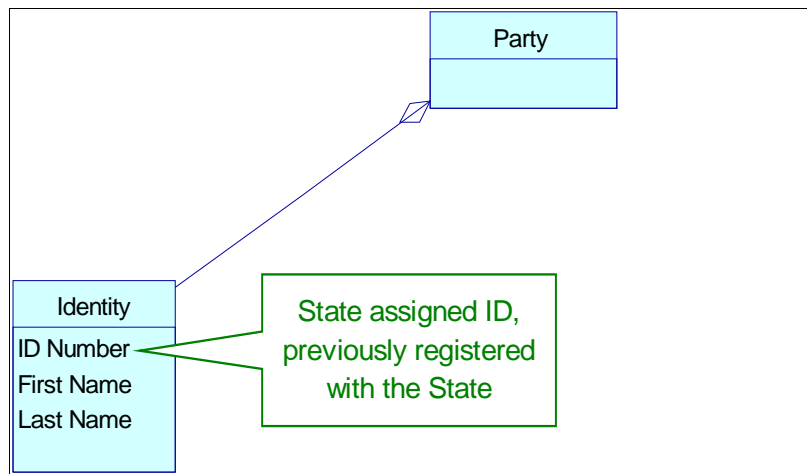
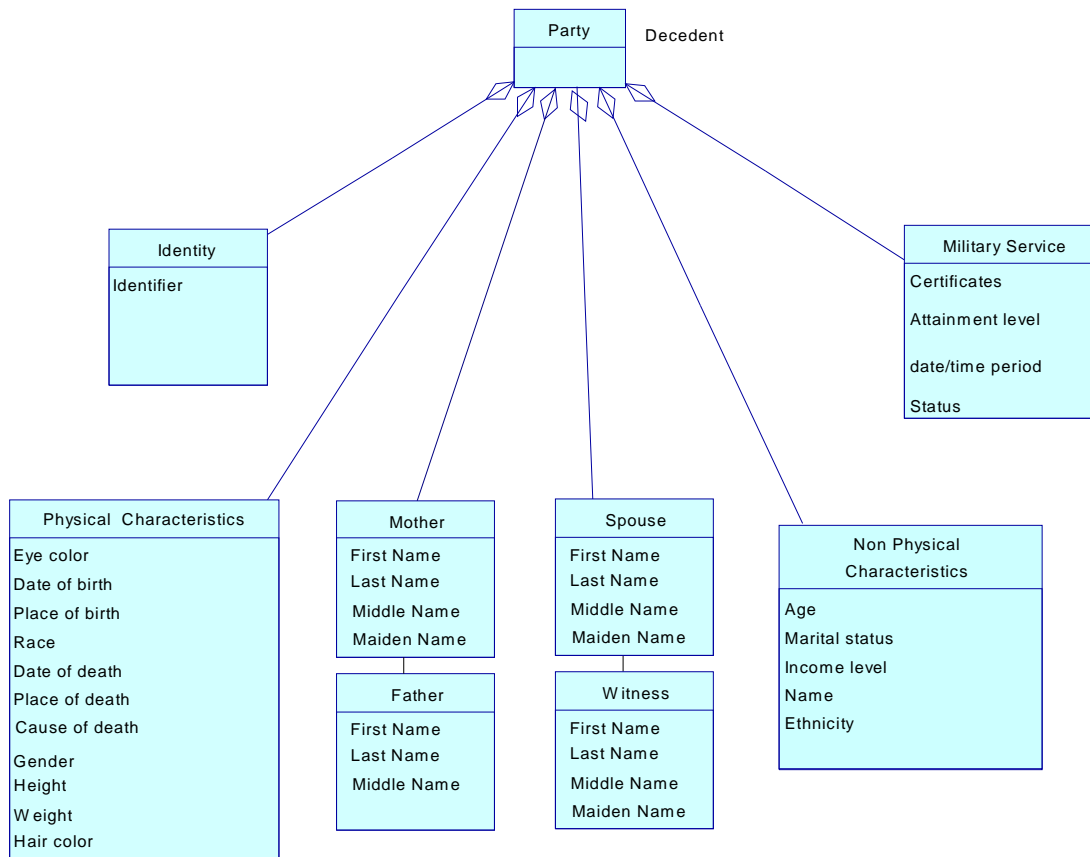


Figure 3

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The Decedent Information Model



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Figure 4

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9.2 Analysis to determine requirements

9.2.1 Scope

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

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9.2.2 Objectives

- Ensure that the information requirements expressed in the model are met with semantically concise and explicit solutions
- Re-use existing components as far as possible to meet cross industry inter-operability goals

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9.2.2.1 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

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individual persons, in varying levels of detail. The other information models also describe parties, which are organizations.

9.2.2.1.1 *External Resources used in this Analysis*

In conducting this analysis, the approach draws upon other subject areas outside of the information technology world, which parallel aspects of this problem space, which are as follows:

- Natural language: In everyday life we use natural languages to communicate with our fellow human beings. This includes, of course, the kind of business communication we try to model in ebXML. A close analysis of our business domain requirements, expressed in natural language, provides an excellent foundation for examining abstractions and document construction. Like in the case of natural language, the requirement is to communicate *who, what, when, where* and *why*. Unlike natural language, business communications typically must communicate all of these details, and in a predictable manner.
- 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 of parts are closely related. This discipline also establishes rules for reuse. For example, when there is a change in the *form, fit* or *function*, then the component is a different component.

9.2.2.1.2 *Functional Set Abstract Superclasses*

Using natural language as a content guide, specified below are the highest level abstractions, or Functional Sets for Core Components. These include:

Parties
Places
Things/Items
Events

For each of these high level classifications, there could be

Identification
Characteristics

9.2.2.1.3 *Message level grammatical decomposition*

Construct a basic sentence describing the Death Registration process.

Register the decedent by the funeral director with the state vital records registrar.

why = register
 who = role parties requestor + registrar
 what = subject party decedent

9.2.2.1.4 Component level grammatical decomposition

Once each high level component is identified, the next step is to systematically decompose each of these high level components into constituent details. This is done in accordance with figure 5, which associates characteristics and identification directly with the decedent, and loosely associates locations, other parties, events and things with the decedent. This decomposition is motivated by the requirement to requirement for core components to be organized in a context neutral manner.

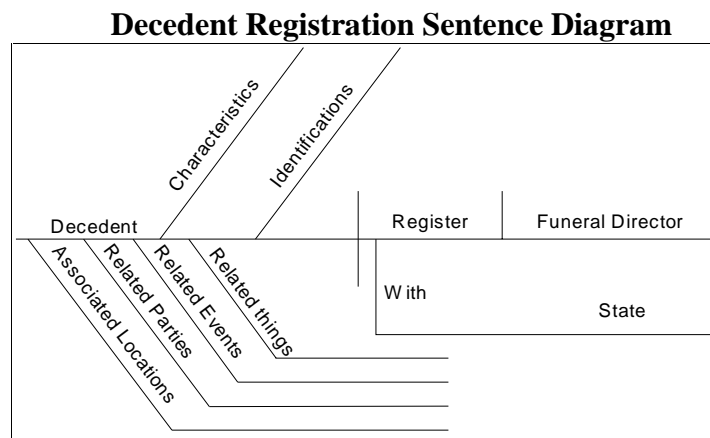


Figure 5

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

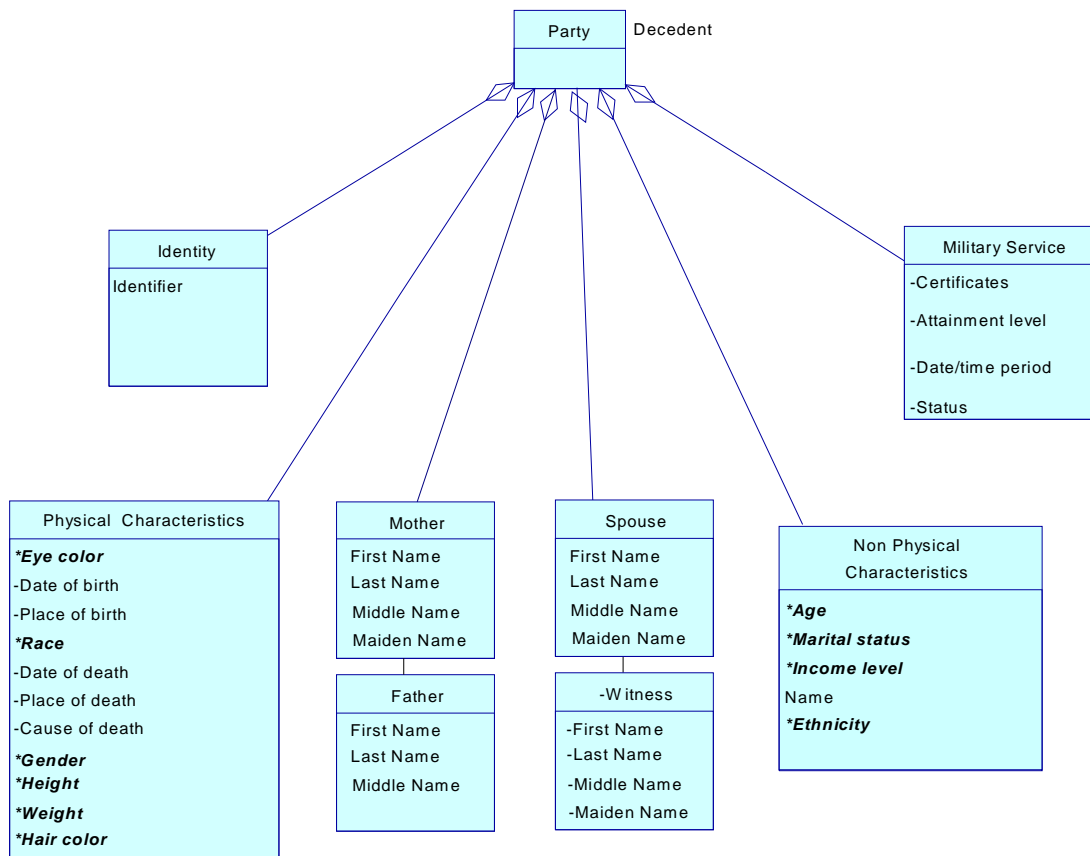


Figure 6

Figure 6 shows the adjectives found prefixed with asterisks, which account for about 1/3 of the decedent party information model. Step 2, locate those descriptors which

Step 2, determine the elements which specify the identity. There is a simple test for these type of identifiers, replace decedent, in the sentence, with a value for the identifier. If the sentence makes sense, that the element specifies identity. The ID number and the Name, fall into this category.

Step 3, locate all details associated with the **events**. Events must have a date/time value and a 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. Mutable experiences must have certificates, and those certificates must have a date/time interval or a status.

In this example, the death is an event, which is a focus of this business document. As a result, the death event is a complex object in that it includes constituents which are parties [witness], locations, and other events [causal chain]. Therefore, a second level of decomposition is required in order to fully decompose this event.

Step 4, other parties. The mother, father, spouse are all parties associated with the decedent. These are distinct from the witness, which is a party associated with the event, the death. 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 (decedent).

In this example, the mother, father and spouse are literally related to the decedent, by definition. They are associated with the decedent, through a connector, and from a grammatical perspective, are objects of a prepositional phrase. Unlike the other parties, the witness is associated with the registration process itself.

Step 5, Places. Places answer *where*, and there are three (3) fundamental types: mailing/delivery, physical (longitude/latitude), and telecommunication. This example recognizes the importance of locations, but for the sake of complexity, location is not dealt with on a detail level.

Step 6, Things. Things, in the ebXML sense include products, physical objects, etc. This entire subject area is not included in this example, but is being referenced for the sake of completeness.

9.3 Discovery 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.

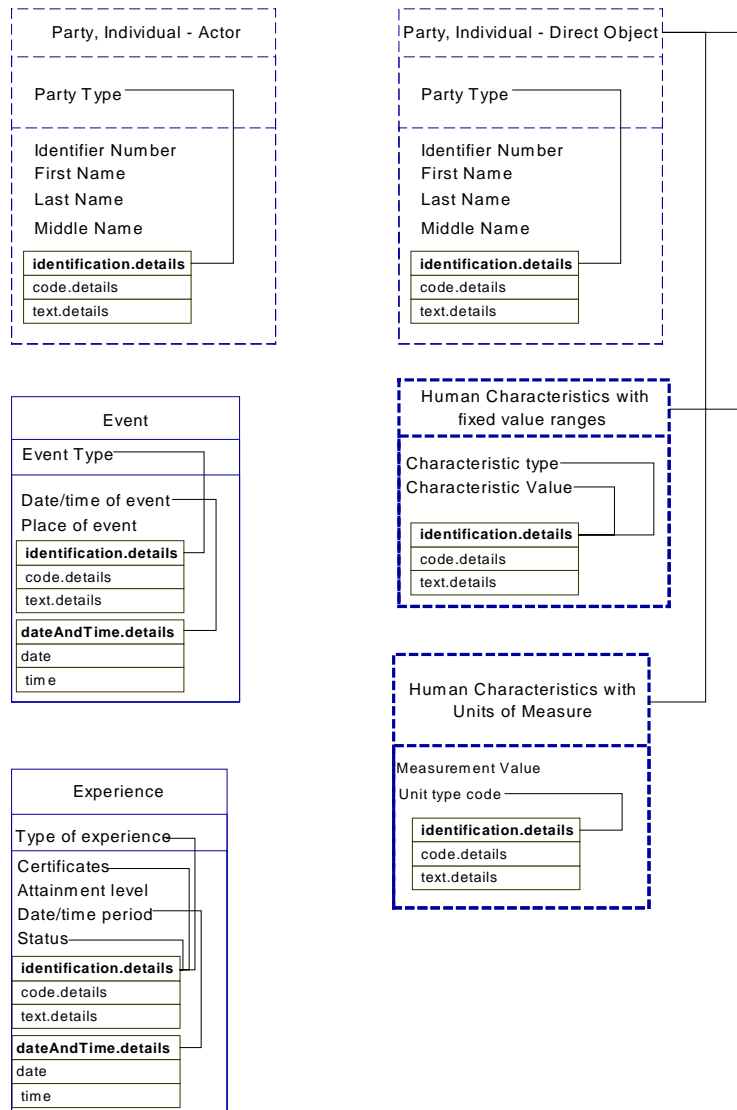


Figure 7

The decedent information requirements, depicted in figure 4, recast according to the core components, are handled as shown in figure 9.

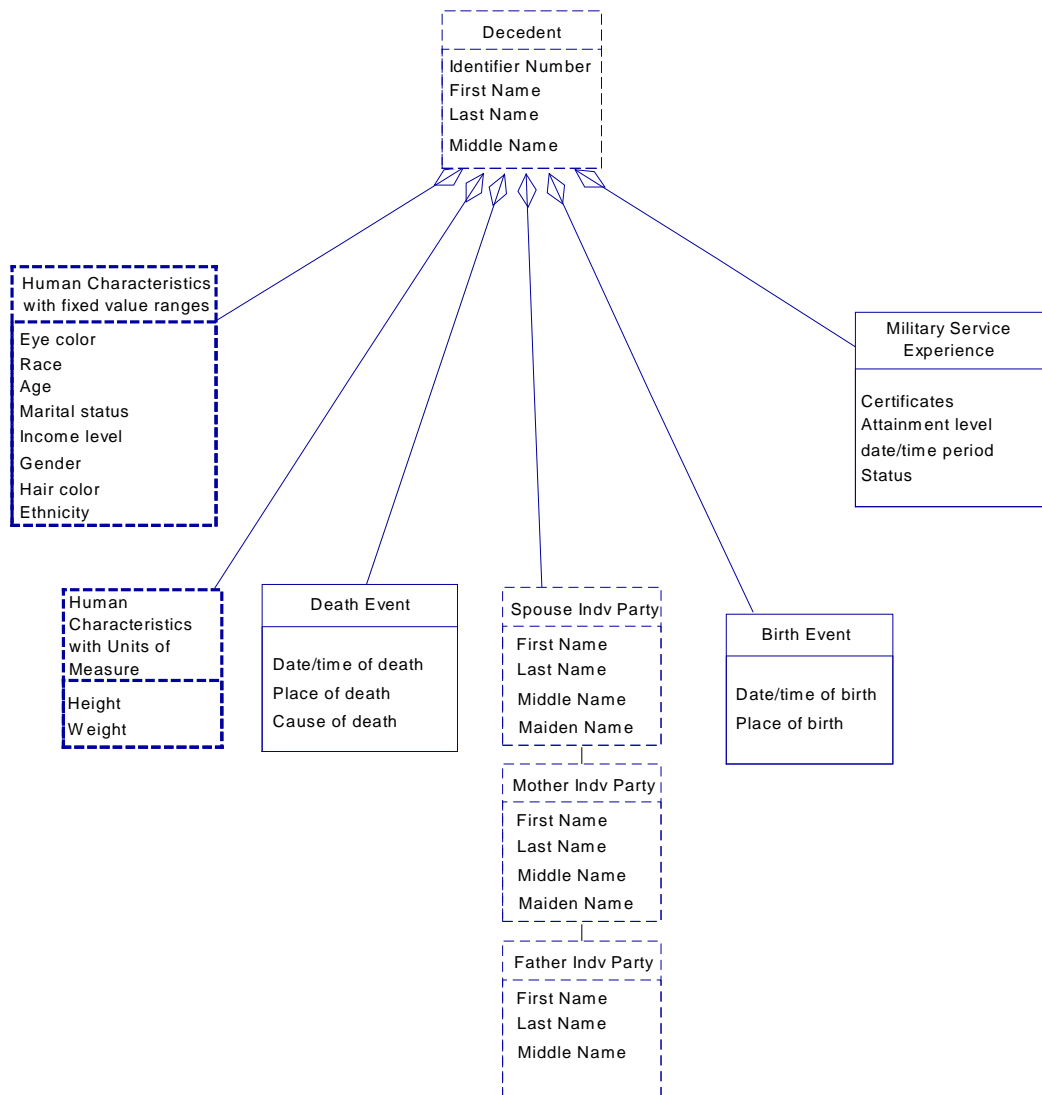


Figure 8

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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673 To be agreed.