



Creating A Single Global Electronic Market

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ebXML Methodology for the Discovery and Analysis of Core Components

ebXML Core Components

February 16, 2001

Version 1.01

20 **1 Status of this Document**

21

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

24

25 Distribution of this document is unlimited.

26

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

28

29

This version:

30

ebXML Methodology for the Discovery and Analysis of Core Components

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Version 1.01

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36 **2 ebXML participants**

37

38 We would like to recognize the following for their significant participation to the
39 development of this document.

40

41 Editing team: Mike Adcock, APACS
42 Sue Probert, Commerce One
43 James Whittle, e CentreUK
44 Gait Boxman, TIE
45 Thomas Becker, SAP

46

47 Team Leader: Sharon Kadlec, North West Airlines, U.S.

48 Vice Team Leader: Lisa Shreve, SysCom Strategies, U.S.

49

50 Contributors:

51	Dee Dee Ptaszek	Sterling Commerce, U.S.
52	Tera Allain	Exxon Global, U.S.
53	Darcy Watson	CP Rail, Canada
54	Melanie McCarthy	General Motors, U.S.
55	Andreas Schultz	GDV, Germany
56	June Arnold	BNSF Railway, U.S.
57	Hartmut Hermes	Siemens, Germany
58	Chris Kupczyk	Logistics Management Institute, U.S.
59		
60	Tim Cochran	DISA, U.S.

61

62

63

64

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100 **4 Introduction**

101 **4.1 Summary of Contents of Document**

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

106
107 Information included in this specification defines the methodology for that approach,
108 detailing discovery and analysis of common components and processes involved in the
109 interchange of business information.

110
111 The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD,
112 SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this
113 document, are to be interpreted as described in RFC 2119 [Bra97].

114 **4.2 Audience**

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

118 **4.3 Related Documents**

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

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

124 **5 Design Objectives**

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

127
128 The objective is to provide guidance for the discovery and analysis of Core Components
129 and common Business Processes used in the interchange of business information.

130 **5.1 Caveats and Assumptions**

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

135

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

140 **6 Overview**

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

144 **6.1 Detailing Discovery and Analysis?**

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

148

149 This guide includes the following:

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

158 **7 Discovery Process Instructions**

159 **Step 1**

160 Identify and document the types of processes needed.

161

162 Examples:

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

164

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

167

168 **Step 2**

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

171

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

174

175 **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

<p>Step 1 State the types of processes needed.</p> <p>Examples:</p> <p>“The business process interchange procurement documents between the automotive industry and the oil supplier.”</p> <p>“The business interchange of a claim notification between a transport company and an insurance company.”</p>			
<p>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</p>	<p>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</p>	<p>Create Component(s) because lists are not available or because no matching items have been found</p>	<p>Create the Business Process because neither lists are available</p>
<p>A</p>	<p>B</p>	<p>C</p>	<p>D</p>

<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>

196 **8 Analysis Process**

197 **8.1 Philosophy**

198

199 Electronic Commerce message designers have long struggled with the difficulty of
200 striking a balance between semantically explicit messages for use between trading partner
201 pairs, and the flexibility needed when trading partners are from different industries
202

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

207 **8.2 Relationship between the ebXML Discovery and Analysis** 208 **Processes**

209

210 The ebXML Discovery and Analysis processes are as follows:

211

- 212 • The discovery process as detailed in the earlier sections, is to assist domain experts
213 (within the following domains finance, transport, travel, materials management) in
214 expressing requirements. This process involves the collection of business process
215 requirements, information requirements and the context within which these
216 requirements apply. For example, the typical order might include a buyer, seller,
217 product/quantity details, payment and shipping. However, if the product involves
218 hazardous materials, this determines the need to provide additional information.
219 Additionally, different geographic regions have different reporting requirements for
220 hazardous materials.
- 221 • The role of the analysis group is to ensure that the information requirements
222 discovered by the domain teams are met with a semantically concise solution, which
223 is structured in a harmonised manner to support the ebXML *cross industry*
224 interoperability goals.
225

226 **8.3 Core Versus Extension**

227

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

235

236 **8.4 ebXML Analysis Scope**

237

238 1. Contexts

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

241 1.1. Collaborations Process Models [refer to ‘Analysis Overview: Business
242 Process to Business Documents’]

243 1.2. Roles

244 1.3. Business Documents

245

246 2. Information models

247 2.1. Functional Sets

248 2.2. Aggregate Information Entity

249 2.3. Basic Information Entity

250

251 **8.5 Aggregate Information**

252

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

256

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

259

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

263

264 Aggregates are based on other Components creating building blocks.

265

- 266 **Rule 01:** The basic information entity identifies a single unit of data whose characteristics are
267 entirely defined by its specification within the Initial Catalogue of Core Components
268 Ver1.0.
269
- 270 **Rule 02:** The basic information entity within an *aggregate* shall relate directly to the purpose of
271 the *aggregate*.
- 272 **Rule 03:** A *data element* within an *aggregate* shall be specified with a *status*.
273

274 **8.6 Functional Set**

275

276 Functional sets are used to group functionally equivalent aggregates. Functional Sets
277 differ from Aggregate Information Entities in one fundamental way. The parent child
278 relationship between the Functional Set and the children, Basic Information Entities or
279 Aggregate Information Entities, represents a decision point where the children are
280 functionally equal and therefore mutually exclusive.
281

282 **9 Appendix - Application of the Analysis Methodology**

283 **9.1 Background**

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

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

290 **9.2 Objectives**

291

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

293

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

302 **9.3 Example**

303 **9.3.1 Death Registry - Introduction**

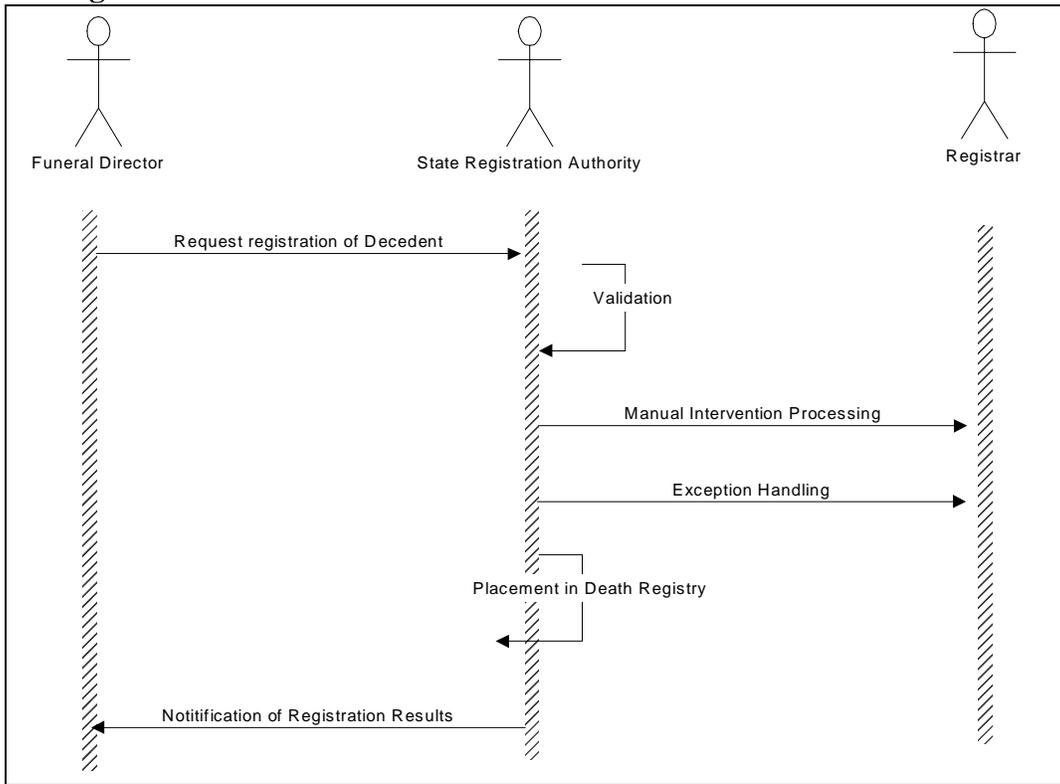
304 What follows is a simplified representation of the process and information requirements
 305 for the registration of a decedent in a death registry. In the United States, vital statistics
 306 are managed at the state level, and state laws dictate details of how this process is carried
 307 out and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

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

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

319
 320 Activity model for registering a decedent (figure 1).

321
 322 **Death Registration Process**



323

324

Figure 1

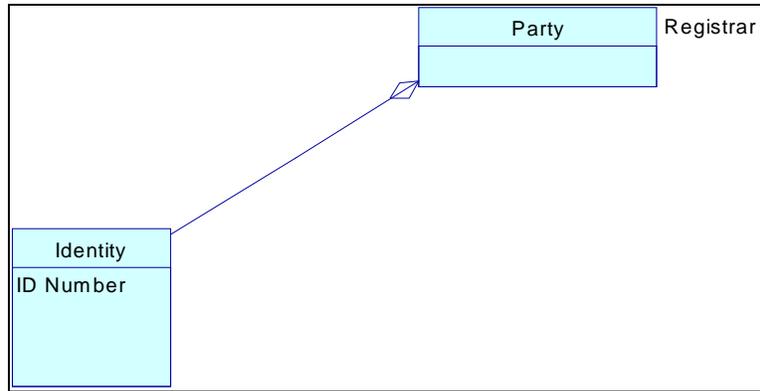
325 9.3.2 Information Models

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

331

332 **The Registrar/State**

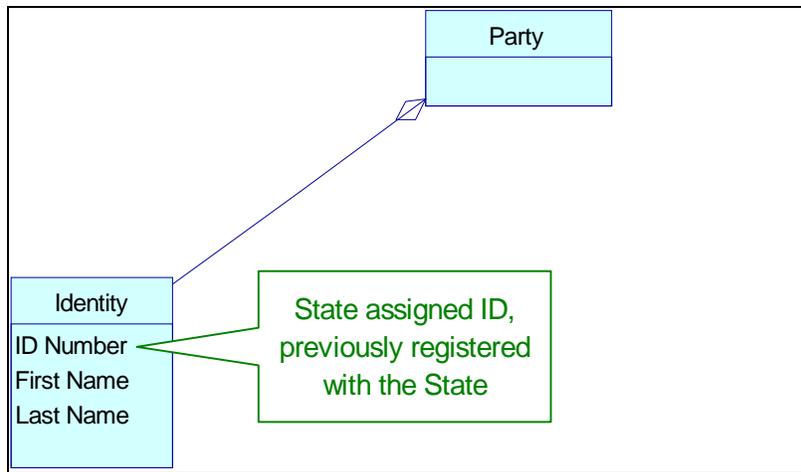
333



334

335 **Figure 2**

336 **The Requester/Funeral Director**



337

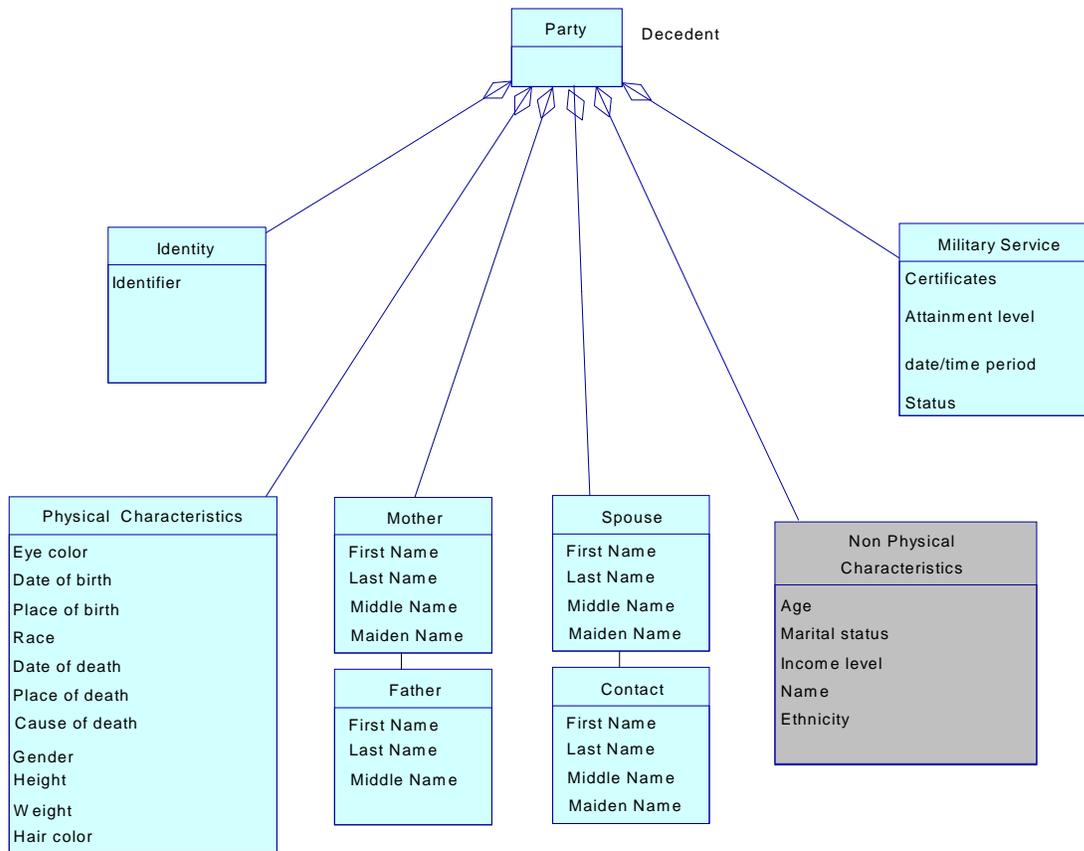
338 **Figure 3**

339

340

341

The Decedent Information Model



342

343

Figure 4

344

345

346

347 **9.4 Analysis**

348 **9.4.1 Scope**

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

351

352 **9.4.2 Objectives**

- 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

358 9.4.3 Historical problems to avoid

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

- 362 • Relationship
- 363 • Cardinality

364

365 9.4.3.1 We tend to overload messages

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

370

371 9.4.3.2 I have a hammer, it must be a nail

- 372 • the tendency is to not look for alternative approaches

373

374 9.4.3.3 Syntax versus semantics.

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

383

384 9.4.3.4 Analysis approach.

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

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

397

398 9.4.3.5 Analysis Steps

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

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

407

408 9.4.3.6 Analysis of Information Models

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

413 9.4.3.6.1 Grammar.

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

416

417 **The funeral director registers the decedent with the state.**

418

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

423

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

432

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

438

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

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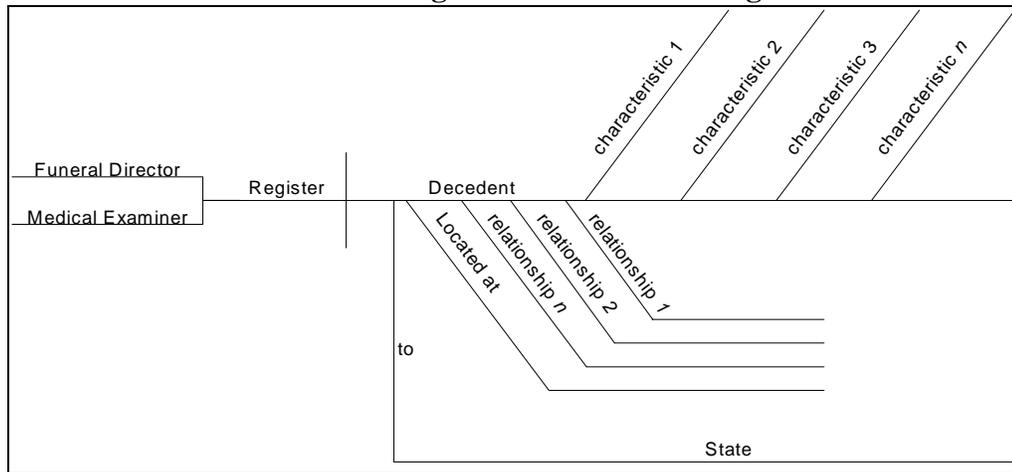
birth, social security number, name, mother’s maiden name, etc.
Authenticating an organization has a similar predictable list.

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



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473
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475
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477
478

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

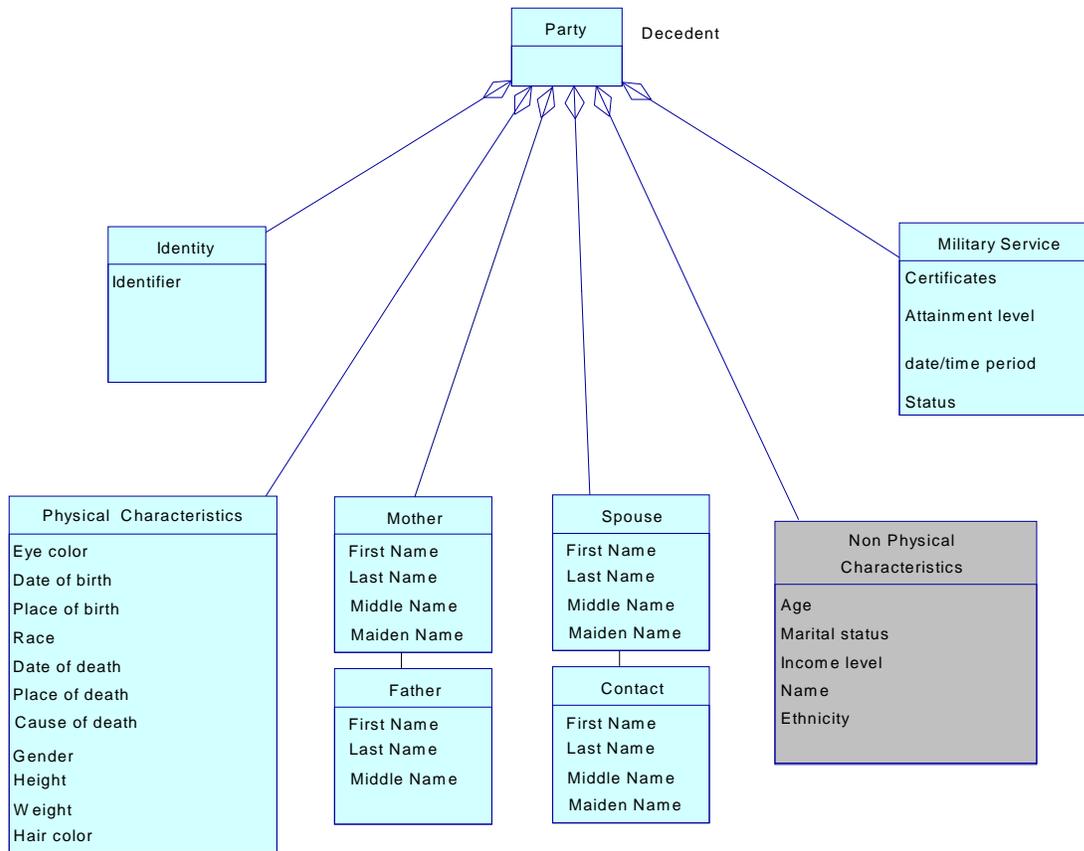
479 sentences, proper tenses, etc. These are outside of our scope. We are
480 looking to grammar for two fundamental things, determining logical
481 groupings, and how to connect. In grammar, you have two types of words.
482 Content words include nouns, adjectives, verbs and adverbs. Structure
483 words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

486
487 Step 1, locate the adjectives. In the upper right portion of our sentence
488 diagram is for adjectives. The nice thing about adjectives is there is an easy
489 test to determine whether something is an adjective, can you put it in front
490 of the noun in the noun phrase. Ok, our decedent is the noun, so the noun
491 phrase has to be “the _____ decedent”. In Figure 6, we
492 have a lengthy list of candidate adjectives to test each. In order to test each
493 one, we can take a value for each one and try placing it into the noun phrase.

494 a) Identifier
495 The 12 decedent,
496 The 12 ID decedent

497
498 It is clear that the identifier is not an adjective.

499
500 b) Eye Color
501
502 “the blue eyed decedent”
503
504 That works, eye color does describe a decedent.
505



506

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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.

527 Immutable experiences are irrevocable, they are. I took a scuba certification
528 dive from Oct 6-7, 1995 and was granted certification, as a level 1 diver. In
529 contrast, mutable experiences are point in time. I took a certification dive
530 from Oct 6-7, 1995 and was granted a certification from Oct 7, 1995 – Oct
531 7, 2000. Mutable experiences must have certificates, and those certificates
532 must have a date/time interval or a status.

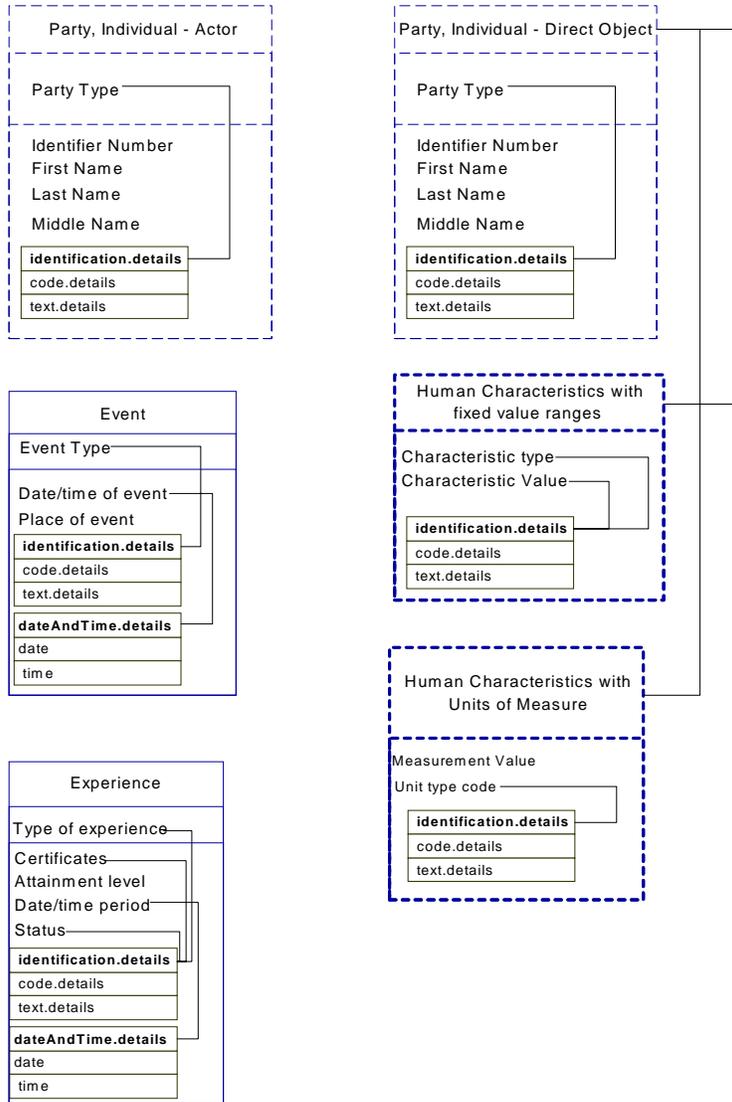
533
534 Mother, father, spouse and contact.
535 It is typical in Business Documents to have other parties, which are not
536 actors in the business process, such as witnesses, relatives, contacts, etc.
537 The fundamental question here is whether they are related to the event or the
538 party (decedent).
539 In this example, the mother, father and spouse are literally related to the
540 decedent, by definition. They are associated with the decedent, through a
541 connector, and from a grammatical perspective, are objects of a
542 prepositional phrase.
543 Unlike the other parties, the contact is associated with the registration
544 process itself.

545
546 Name and ID
547 These are the means by which to identify a specific decedent, and from a
548 grammar standpoint, decedent becomes the adjective when used with the
549 name or ID of the specific decedent.

550

551 **9.5 Analysis Conclusions**

552 Simple grammatical constructs have yielded a small set of categorizations for the core
553 components. These categories are Party/Person/Organization <short dash outline>,
554 Events <solid outline>, and Characteristics <long dash outline>, shown in figure 8.
555



556

557

558

Figure 8

559

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.

565

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

566

567

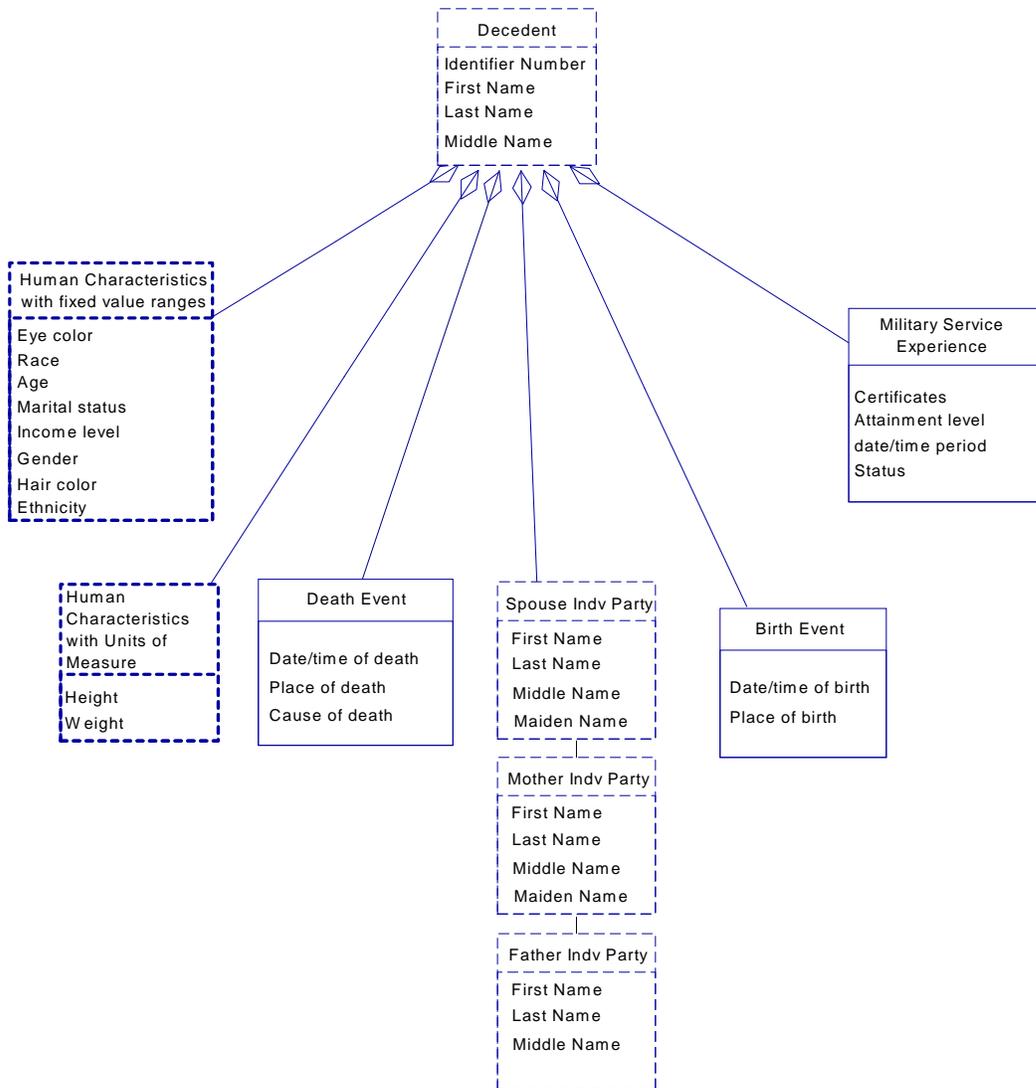


Figure 9

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576 11 Contact Information

577

578 Team Lead

579 Name Sharon Kadlec

580 Company Northwest Airlines Inc.

581 Street 5101 Northwest drive

582 city, state, zip/other St Paul, Minnesota 55111-3034

583 Nation U.S.

584

585 Phone: + 1 612 726 2277

586 EMail: Sharon.Kadlec@nwa.com

587

588 Vice Team Lead

589 Name Lisa M. Shreve

590 Company SysCom Strategies Inc.

591 Street 6856 Cathedral

592 city, state, zip/other Bloomfield, MI 48301

593 Nation USA

594

595 Phone: + 1 248 737 3362

596 EMail: lshreve@mediaone.net

597

598 Editor

599 Name Sue Probert

600 Company Commerce One UK

601 Street 103 Belper Road

602 city, state, zip/other Derby DE1 3ER

603 Nation UK

604

605 Phone: + 44 1332 342080

606 EMail: sue.probert@commerceone.com

607

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611 To be defined