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Short Description:

The deliverable D15.6 defines the “Generic Business Vocabulary”, a tool for the definition of an Enterprise’s Business Model. The BML requirements affirm that BML should be a framework which allows business people to represent their own business in a colloquial language that use to communicate in their environment.

The main aim of BML is focused on business people and their language, which allow them to represent the knowledge related to products and services offered by their firms.

The Generic Business Vocabulary contains terms, fact and rules common to each domain and it’s useful for business modeler and domain modeler too. They can define their own concepts by extending the Generic Business Vocabulary’s concepts or use the items of the Generic Business Vocabulary as-is, without change them.

Partners owning: ISUFI – Angelo Corallo, Maurizio De Tommasi, Virginia Cisternino, Emanuele Caputo

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1st Internal Reviewer: Jukka Huhtamäki - TUT

2nd Internal Reviewer: Giulio Marcon - STU

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1. The business model in the BML architecture

This is an examination of the characteristics of the business models present in the BML architecture and the mechanisms of the SBVR utilization as interface between the users and the BML.

The SBVR specifies expect the utilization of Vocabulary and Rules in the generation of models which can find place in several layers of the MOF stack. These models can also be translated in a machine-readable form.

We see now the difference between domain modelling and specific business modelling. The BML framework allow these two types of modelling.

A domain modeler had to design an industry in general, describing the relations between the specifics businesses which it includes and trying to find all the domain's peculiarities.

The modeler will defines all the concepts and the rules which control that specific domain and which are common to all the businesses of that domain

The modeler can start from the vocabulary and define his business *ex novo* or from the domain model and detail his business, defining the concepts and the rules which governs that specific business.

There are many differences between two businesses which belongs to the same domain. Each business has its own problems, rules and concepts.

The business modeler, and the domain modeler too, can specialize the BML Vocabulary, use the Generic Business Vocabulary or import and adapt an existing vocabulary from another community.

The description can be made in a natural language, so the modeler can optimize (take the maximum advantage from) his expressive ability. Passing through an interpretation made by Structured English Mapping Rules, the description will be expressed in Structured English. The result of this work is a description with the aspect of a vocabulary, in which in the formal statement exclusively names appear nearly, predicates, words key.

This version of the model is expressed in SBVR MOF format. Next, with the application of the SBVR-to-MOF/XMI we obtain the MOF Model, which can be exchanged or archived as a document. This conversion observes the XML production rules and it's simple because of the XMI's compatibility.

The Generic Business Vocabulary contains terms, fact and rules common to each domain and it's useful for business modeler and domain modeler too. They can define their own concepts by extending the Generic Business Vocabulary's concepts or use the items of the Generic Business Vocabulary *as-is*, without change them.

The SBVR Fact-Oriented Approach allow the add of new rules and other adjustment, because it don't needs modifications to terms, predicates, classes and relations of the domain independent model. In effect the facts will be added as specifications of the Fact Class and Classification Class of the ESBVR (extension of SBVR).

2. SBVR as business modelling tool: the reasons of the choice

SBVR is the chosen tool for the creation of the Generic Business Vocabulary. The reasons of this choice are connected to the aims which have carried to the introduction of a Rule-Based Approach as SBVR.

We'll consider mainly these aspects:

- How SBVR satisfies the aims and the requirements of DBE and BML;
- How the SME can gain advantage by using SBVR.

In a MDA perspective, the BML Vocabulary 2.0, imported by the Generic Business Vocabulary, is designed to be a Computation Independent Model (CIM).

By this point of view, the choice of the SBVR as expressive tool is a good option. In fact it is contained in the business model layer of the OMG's Model Driven Architecture.

The SBVR model (Vocabulary + Rules) conceptually are very close to the CIM. They allow the representation of the business environment without technical details; furthermore they are designed for the business people, for the experts of that domain.

So the model based on SBVR can be used to generate model for IT Systems (platform-independent models e platform-specific models).

Is improbable that an IT expert, who had to model a specific business, can gather his peculiarities, because these concepts that he had to model don't belong to him. SBVR can be used to describe a firm, with all its particulars, products and services offered by the firm, furthermore the procedures practiced by the firm in making trades agreements with its partners and the characteristic of this agreement, the rules, the boundaries, the parameters used to choose the partners.

So, even if the creation of the models is realized by IT experts, there will be no problems, because they and the business people speak the same language, based on a common vocabulary.

We must also underline the accordance of the SBVR approach with MOF. The SBVR specification defines a metamodel and allow the creation of an its instance; so we can create various vocabularies and define the business rules. It is also possible complete these models with suitable informations, for describing a specific organization.

Conceptually this means creating an object for each one of the four level of the MOF architecture. It is possible to affirm that SBVR is created in order to work on models, documents and linguistic structures which can be located in every MOF level. Furthermore the SBVR approach provides the tools (nased on mapping rules) for translating from natural language into MOF-compliant documents

Another important reason in order to choose SBVR as linguistic metamodel for BML Vocabulary, and therefore for Generic Busines Vocabulary, is base on a strong matching of their aims.

The BML requirements affirm that BML should be a framework which allows business people to represent their own business in a colloquial language that use to communicate in their environment.

The main aim of BML is focused on business people and their language, which allow them to represent the knowledge related to products and services offered by their firms.

SBVR is designed in the same perspective and represents a framework which aims to offer a linguistic support to business analysts for defining, in their language, the way by which they manage their business, with terms belonging to the arguments that they practice in their business.

Another aim of BML is allow a simple interchange of business models. The SBVR approach permits obtaining also this target: SBVR uses MOF to produce interchangeable models stored in MOF Rapository.

By the point of view of the firm, the choice of SBVR entails two main benefits:

- using it an Enterprice can describe itself in a natural way. With SBVR business people are the main subject in the creation of a model, is not necessary involve the IT experts in this process, because the utilization of a natural language allow business people to choose what they want to represent and to create the correct rules to express this knowledge. To join this aim is necessary provide the right tools to business people. Even if the model creation is a task for an IT modeler, the communication problems (between the IT modeler and the business people) can be bypassed because they are forced to use the same language, based on a common vocabulary. So it is possible to escape mistakens and different renderings of the same terms and concepts.
- The second benefit is related to the utilization of rules into Information Systems build for support the business activities. The SME are the main receivers of the DBE project and, in particular, the software producers. They could realize reusable productive patterns BML-based and therefore also based on the Genric Business Vocabulary . The SBVR allows to avoid discord between that an enterprise wants that its system makes and as it realizes it.

Furthermore, thanks to its conformity to MDA-Approach, the SBVR can offer a support to the automatization of the production of the software: starting from the SBVR models it could be possible to create automatically diagrams, classes and source-code. For these reasons, We can think that the SBVR is much powerful in supporting production of software, it allow the

reuse and the automation. The following 2 paragraphs shows the SBVR-Based BML Framework and the BML 2.0.

3 SBVR-based BML Framework

3.1 *Need for natural language*

E-business adoption represents a unique opportunity for European SMEs to gain competitiveness by improving their business performance at a local level and helping them take advantage of global market opportunities.

A major stumbling block for SMEs in adopting new ICT is the lack of a common operational notion describing business needs and ICT solutions. The need for natural language as a means for business modelling is particularly important in order to allow SMEs (with appropriate but minimum technological training) to author, validate, and dynamically define and redefine in the underlying IT-systems their products, services, prices, policies and terms. As such, following the MDA roadmap, the direct involvement of business actors as well as the adoption of a business oriented formal language in business modelling would represent a concrete attempt to align the business strategy with IT infrastructure.

The objective of BML in the second phase of the project (as already depicted in D15.1) is to act as natural language based interface toward the DBE architecture and enabling business people to conduct business in a seamless and fluid manner, as they usually do in actual business context, while using the advanced DBE software services technologies.

3.2 *Natural language business modelling*

Methodologies used in software development (e.g. OOD) are typically applied when a problem is already formulated and well described. Starting from this point, software developers transform requirements into code with a relatively repetitive process. Nevertheless, the actual difficulty lies in the previous step, that is describing problems and expected functionalities. Stakeholders involved in software development can express their ideas using a language very close to them, but they usually are not able to formalize these concepts in a clear and unambiguous way. Indeed, the richness of structures and meanings of a natural language can provide a great expressiveness, but it determines a lack in terms of formalism. As a consequence, a very important role is played by requirements analysts that act as a sort of translator between stakeholders and software developers. Obviously, this implies a large effort in order to interpret and understand real meanings and concepts hidden among stakeholders words.

Special constraints on syntax or predefined linguistic structures can be used in order to overcome this problem, enabling natural language to well represent and formally define business requirements (CIM). The main purpose of natural language modelling approach is hence to make natural language suitable for conceptual modelling. In other words, it aims at designing analytic processes able to produce a simple syntax and to reduce ambiguity and vagueness, preserving language completeness and essential meaning [BOYD]. The focus is on semantic aspects and shared meanings, while syntax is thought in a perspective based on formal logic mapping.

Natural language is generally used by business organizations in order to describe themselves and their rules. Nevertheless, even if complex constructs and ambiguous forms of expression provide a great communicative power, they usually make this description unclear and informal. This problem is largely amplified considering that involved people often do not share concepts and meanings.

Conversely, as envisioned by MDA, system requirements gathering and creation of machine-readable documents need a higher degree of precision and formality (i.e. to be compliant with a metamodel or a grammar), with a consequent loss in richness of meaning and expressions. Bridging the existing gap between business people language and other formal languages, used for software development and document interchange capabilities, represents a fundamental issue for BML.

In this perspective, a modelling approach based on natural language could be a very interesting choice in order to balance these opposite needs. Indeed, this approach can provide BML users with a powerful means allowing them to use their own language in order to create consistent, unambiguous and formal business models.

3.3 Why SBVR?

This section aims to explain which are the motivations for introducing a rules-based approach such as SBVR within the DBE project and the main advantages coming from this choice. For this reason, the most interesting SBVR features, from a BML point of view, are analyzed and discussed below. In particular, this section addresses the following issues:

- how SBVR meets DBE and BML purposes and requirements;
- how SMEs can benefit from SBVR.

First of all, in an MDA perspective, BML is conceived to be a Computation Independent Model (CIM). From this point of view, using SBVR as a mean of expression is a suitable choice, since it is entirely within the business model layer of the OMG's Model Driven Architecture (Figure 1). In fact, business vocabularies and related rules are conceptually a CIM: they allow business environment representation, avoiding technical details; moreover, they are thought by and for business people (i.e. domain practitioners).

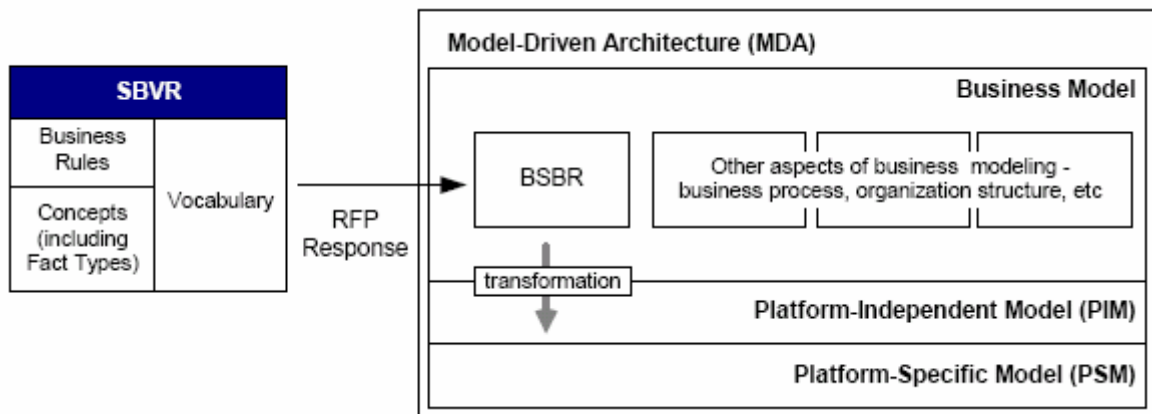


Figure 1: SBVR in Model-Driven Architecture [SBVR]

This implies that models based on SBVR can be used to generate models for IT systems (platform-independent and platform-specific models), even if providing guidance for this transformation is beyond the purposes of this document.

Another important remark is related to the compliance of the SBVR approach to MOF. SBVR specification defines a metamodel and allows to instance it, in order to create different vocabularies and to define the related business rules; it is also possible to complete these models with data suitable to describe a specific organization. Conceptually, this corresponds to place an artifact in each level of the traditional four levels MOF architecture. As described in the following sections, creating SBVR models in natural language and placing them in such metadata architecture is actually a more complex process, that will be discussed in part later. However, it is possible to assert that SBVR is created to work involving models, document and linguistic structures placeable in each MOF level. Furthermore, the SBVR approach provides means (i.e. mapping rules) to translate natural language artifacts into MOF-compliant artifacts; this allows to exploit all the advantages related to MOF (repository facilities, interchangeability, tools, ...), satisfying BML requirements related to its use within a distributed environment.

Besides the previously described aspects, an important reason to chose SBVR as the linguistic metamodel for BML is represented by the strong matching between their objectives. BML requirements explicitly assert that it should be a framework enabling

business people to represent the business knowledge in a language close to the one the business people actually use to communicate with each other. Consequently, the primary BML focus is toward business people and their language, in order to allow them representing the business knowledge related to the offered services and products and to the enterprises that stand behind them. As stated above, SBVR is thought in this perspective and it represents a framework aiming to provide linguistic support to business analysts in order to define the way by which “they run their business in their own language, in terms of the things they deal with in the business” [BSBR].

Another BML purpose is to enable easy interchange (between business modelling tools or metadata repositories in distributed heterogeneous environment) of business models. From this point of view, SBVR approach allows to reach this purpose as well: as stated above, SBVR uses MOF in order to produce interchangeable artifacts, storable in MOF repositories.

In an enterprise perspective, choosing SBVR implies two main kind of benefits. First of all, using it allows organizations to describe themselves in a natural way. In other words, with SBVR business people play a central role in models creation: there is no need to involve IT practitioners in this process, since using natural language enables business men to choose what they want to represent and to create the suitable rules expressing this knowledge. Obviously, in order to reach this result, it is essential to provide them with the right tools. However, even if models creation is performed by IT modellers (a more likely scenario), communications problems can be easily overcome, since modellers and business people are forced to use the same language, based on a shared and accepted vocabulary. In this way, it is possible to avoid misunderstanding and different interpretations of the same terms and concepts. A vocabulary created by information system experts to specify business requirements could employ terms commonly used in the business anyway. Nevertheless, their meaning should be restricted to or influenced by the information systems concepts that are used to represent the corresponding business concepts. This vocabulary should not be a “business vocabulary” but rather an “information technology model of business concepts”.

The second benefit is related to using rules within information systems aimed at supporting business activities. As formerly stated, the main DBE project recipients are SMEs and, in particular, those involved in software development. The latter could realize reusable production patterns based on enterprise BML models and on Service DNA. SBVR can offer support in this perspective, since one of its design objectives is “to make the business rules accessible to software tools of several kinds, including [...] software tools that support the information technology experts in converting business rules into implementation rules for automated systems” [BSBR]. Consequently, SBVR allows to avoid mismatching between what an enterprise wants its system to do and how to realize it. Moreover, due to its compliance with the MDA approach, SBVR can offer support in automating software production: starting from SBVR models, it should be possible to create diagrams, classes and code in an automated way. This implies that SBVR is expected to be very powerful in order to support SMEs producing software to exploit reuse and automation.

3.4 CIM Framework architecture

In this section the architecture of the updated CIM framework is presented. It introduces the main parts of the framework and their relationships with the BML 1.0 architecture.

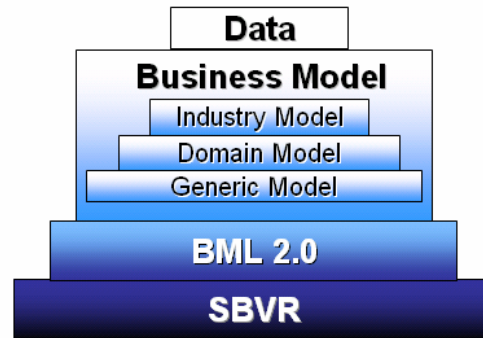


Figure 2: BML 2.0 framework stack

As figure 2 shows, BML 2.0 is built on top of SBVR in that it defines standard terms, facts and rules specializing SBVR meta-concepts. In the same way, BML is used in order to create business models: a modeller specializes BML terms and facts in order to define concepts proper of a given business. A business model could include several models (domain independent, domain dependent or industry models).

This means that passing from the UML/MOF to the SBVR structured language the way to create a model changes radically. In the UML/MOF approach, an artifact is generated passing through a MOF level (i.e. creating instances). Conversely, in the SBVR approach, a specialization mechanism is adopted; only by adding data (populating the model) it is possible to speak about instances. Figure 3 shows this mechanism. Conceptually, this corresponds to collapse M3, M2 and M1 MOF levels into one, solving some important problems: business people speak about concepts using other concepts, regardless the number of levels introduced; moreover, they relate concepts among them regardless if they are in different levels. This means that, from a business perspective, forcing to use a four layered structure is very limitative.

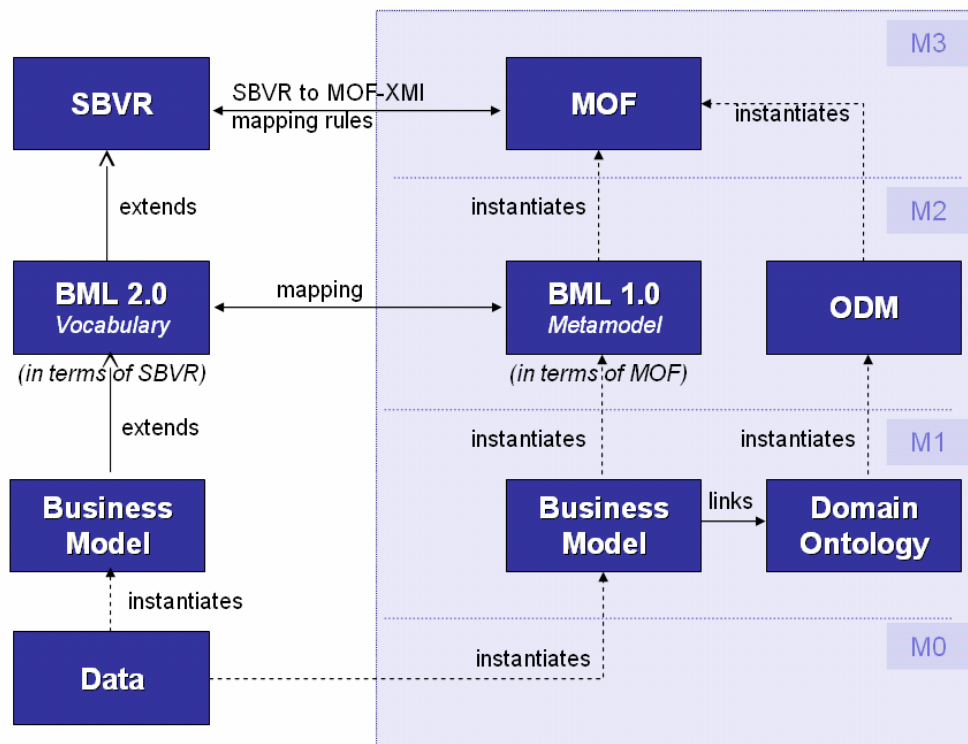


Figure 3: BML 1.0 vs BML 2.0

3.5 Defining the BML semantics through SBVR

In order to be a CIM language, BML models (expressed in natural language through business rules) have to be mapped to formal logic (enabling automatic generation of Platform Independent system Models) and to interchangeable format (e.g. MOF and XMI, granting interoperability among different SMEs and communities).

To fulfil these requirements the BML abstract syntax and semantics is formally defined by means of SBVR.

Building BML on top of SBVR provides linguistic support to business men for formally defining and sharing business semantics in terms of business facts and rules represented in Structured English notation. Furthermore, the SBVR approach gives BML the capability to translate natural language artifacts into MOF-compliant artifacts (i.e. through MOF/XMI mapping rules defined by SBVR in [SBVR]); this allows to exploit all the advantages related to MOF (repository facilities, interchangeability, tools,), satisfying BML requirements related to its use within a distributed environment.

Due to its compliance with the MDA approach, SBVR can offer support in Model Driven Development (MDD). This implies that BML models based on SBVR can be used in order to generate models for IT systems (PIMs, PSMs, diagrams, classes and code) in an automated way, thus supporting SMEs producing software to exploit reuse and automation and allowing business people to play a central role in system models creation.

The first phase of the project produced a MOF model that embeds general concepts useful to describe all kinds of business. In order to introduce SBVR as concrete syntax for BML, it is necessary to translate the MOF model, previously produced, in accordance with the SBVR syntax. The output of this complex mapping can be named as *BML Vocabulary and Rules*.

This translation is realized on the basis of the converse process, clearly explained in SBVR specification, that defines the way to obtain a graphical (UML-based) representation of an SBVR-compliant vocabulary. For example, each class generates a vocabulary entry; associations imply creating fact types; relationship multiplicities are translated using necessity statements (structural rules) and so on.

Even if this translation process could seem very simple, it actually requires a lot of care. In fact, due to their different purposes, MOF-compliant metamodels and SBVR vocabularies tend to emphasize different aspects of modelling; as a consequence, some changes had to be made in order to use forms of expression very close to natural language. For example, names of both associations or association ends could be modified in order to obtain sentences that could be used by people in their speech.

In order to demonstrate how this translation is performed, consider Figure 50:

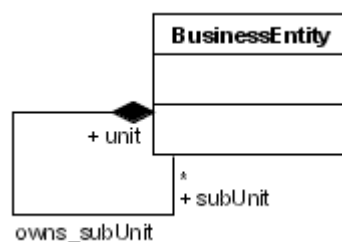


Figure 4: Composition of Business Entities in the BML metamodel

This excerpt from the BML metamodel generates the following vocabulary entries:

business entity

business element that represents something that has a real existence in a business context. It has an own existence independently from its functions, activities or relationships. It extends the business element concept.

subunit

role

business entity

unit

role

business entity

unit owns subunit

partitive fact type

business entity with the role of unit is a composition of smaller entities (subunits), this relationship meets the need to represent complex organizational structures.

Each subunit *is owned by* exactly one unit

subunit *is owned by* unit

Some considerations about this example are needed. First of all, note that for business entity no General Concept is provided: in this case, it is elicited directly from the definition, that highlights the inheritance from the business element concept (not shown in the figure). Moreover, unit and subunit do not own a definition: since they are roles of business entity, there is no need to further define them. In regard to the fact type unit owns subunit, the verb used in the metamodel (i.e. 'owns_subUnit') is changed into 'owns' in order to avoid unnecessary repetitions; furthermore, a passive form is provided as synonymous form. Moreover, its concept type is 'partitive fact type' to represent the composition association that models this relationship within the BML metamodel. Finally, note that all the definitions are provided in an informal or semiformal way.

To obtain an SBVR-compliant version of the BML this translation must be applied to the whole metamodel; as a consequence, it is necessary to pay particular attention in order to give a coherent and understandable form to the whole vocabulary structure. Nevertheless, this translation is not the sole work needed to fully express BML semantics using SBVR, since it is also necessary to introduce some constraints. This last step is essential for expressing the 'operative rules' of BML, i.e. to force some particular use of BML concepts and relationships. For example, if it is required that a behaviour fulfilling a commitment involves the same actors that are participants of that commitment, it is necessary to introduce the following rule:

it is necessary that each actor that *is involved in* a behaviour *is involved in* the commitment that *is fulfilled by* the behaviour.

Obviously, this formulation requires defining passive forms for the fact types expressing the relationships between the different concepts involved in the rule formulation.

A further remark is related to the MOF version of the vocabulary generated through this translation process. In fact, applying the MOF/XML mapping provided by SBVR, as described in 7.8, it is possible to generate a MOF-compliant representation starting from the BML Vocabulary and Rules. Note that this resulting model is deeply different from the BML Metamodel proposed in the first part of this document. Even if they both express the BML semantics, they should not be confused: while the latter can be called a Business Object Model, the former, generated from the vocabulary, can be defined as fact-oriented, since it reflects the SBVR fact-orientation. Anyway, since BML is oriented toward business people but it can also be used by IT professionals, both these representations can be useful for the purposes of BML.

3.6 Creating a BML business model

BML Vocabulary and Rules define standard terms, facts and rules specializing SBVR meta-concepts. In the same way, BML is used to create business models: a modeller specializes BML terms and facts in order to define concepts proper of a given business or domain. For example, remembering that [business entity](#), [service](#) and their related fact type ([business entity provides service](#)) are concepts defined by the BML metamodel, if an 'Hotel' and its main service must be modelled it is possible to write:

hotel

General Concept: [business entity](#)

A public house kept for the lodging and entertainment of travellers, or of any who wish to use its accommodation

Source: based on [Oxford English Dictionary](#) ["hotel"]

hotel provides room rental

room rental

[service](#) offered in order to provide accommodation for customers

The example proposed above shows how each element introduced in a business model is referred to a more general concept defined within the BML Vocabulary. Obviously, the created model has also to respect BML Rules. The way of forcing this compliance is strictly related to the design choices of a modelling tool; for example, a tool could let the user say anything, it could provide a semantic check on BML models once they are created or it could provide a structured way to write these models in compliance with the metamodel.

As previously described, specializing BML concepts is a general way to create a business model. Actually, since SBVR provides a great flexibility in terms of importing vocabularies, it is also possible to use concepts defined by external sources to create a specific business vocabulary.

At this regard, referring to the BML stack (see Figure 2), it is necessary to spend some words about the layered business modelling approach.

A particular business model is build on top of other models (not mandatory) which could be provided by industry groups, or company-wide semantic integration initiatives. Generic model defines domain independent concepts related to business in general (e.g. the concept of "price", "currency", "customer", ...). Domain and Industry model relate to a particular domain or industrial sector and allow to define concepts such as "traveller", "accommodation", "travel agency", and so on.

Those models act as a sort of library usable by modellers in several ways. For example, terms and facts can be directly used or they can be specialized within the business model.

Such approach allows to share concepts and definitions with the most members of the community.

These considerations are well-grounded also in relation with other external vocabularies. Importing already defined concepts, although not domain-specific, can bring several advantages anyway. First of all, this allows to save efforts and time, needed to create a vocabulary and define business rules. Other advantages are related to sharing meanings with external organizations involved in the business, such as some partners that are not members of a specific community, or to the possibility to discover and adopt best practices created by similar organizations.

Summarizing, it is possible to follow several ways for creating a BML business model, that are:

- directly specializing BML concepts;
- using the generic package provided by the platform;
- using a domain model provided by an industry or a community or other existing vocabularies.

Obviously, these are not exclusive ways, their combinations are allowed in order to provide modellers with great flexibility and ease of use. Choosing the right way to create a business model represents a key factor for obtaining a good representation of the enterprise being described.

3.7 Model population

In the new BML 2.0 framework data are created by means of simple sentences asserting facts (which differ from fact types since a fact refers to Individual Concepts) about the model being populated.

For instance, consider the following business model (i.e a set of fact types):

car rental

business entity

the name of the car rental

car rental *has* name

car storage capacity

number of cars that *can be stored at* the car rental site

car rental *has* car storage capacity

Note that:

- the 'Reference Scheme' for the concept car rental is the name of the car rental. This means that instances of car rental can be identified by the name of the car rental.
- car storage capacity has been defined as a number which is an SBVR concept and allows to specify the car storage capacity as a number.
- name has not been defined in the model since it is part of the SBVR vocabulary.

Given this model, it can be populated (instantiated) with the following fact:

The car rental 'Hertz' *has* car storage capacity 200.

Moreover, due to separation between representation and logical formulation in SBVR, the following facts are semantically equivalent (i.e. have the same logical representation) to the previous one:

The car rental that *has* name 'Hertz' *has* car storage capacity 200.

A given car rental that *has* name 'Hertz' *has* car storage capacity 200.

A given car rental *has* name 'Hertz'. The car rental *has* car storage capacity 200.

The car storage capacity of the car rental 'Hertz' *is* 200.

Note in this last case that in SBVR any fact type having the form placeholder1 *has* placeholder2 has implicitly the synonymous form placeholder2 *is of* placeholder1.

4 BML 2.0 Vocabulary

4.1 Introduction

This section defines the BML semantics as a set of vocabularies expressed in SBVR notation.

4.2 The Business Context Vocabulary

Business Context Vocabulary

English

Adopting Communities

DBE's actors that will sustain, adopt and evolve DBE platform and frameworks, creating specific DBE implementations.

URI: Innovative territory, open source community.

Adopting Communities can decide how to develop its own DBE implementation and have to choose whether to borrow implementations from other existing communities or to build its own specific implementation of the DBE, starting from the basic platform.

It is necessary that Adopting Communities is responsible to adapt specifications proposed by the DBE Project Partners to the local needs and to adopt, modify and extend frameworks, components and general facilities.

It is necessary that Adopting Communities is responsible to develop specific supporting tools.

Necessity: It is necessary that Adopting Communities is responsible to identify mechanisms and local policies to accelerate the adoption process.

It is necessary that Adopting Communities is responsible to produce its own specifications and requirements for Software SME.

BML Metamodel Concepts

The universe of discourse that is the set of concepts that are accepted as important across the BML Users.

BML Metamodel Concepts *is relevant to* Business Modelling Language

BML Metamodel Concepts *is important to* Business Modelling Language

BML Metamodel English Vocabulary

The vocabulary that *is used by* the BML English Users.

The vocabulary that *is defined by* DBE Project Partners

The Merriam-Webster Unabridged Dictionary *is adopted by* the BML Metamodel English Vocabulary.

Business Modelling Language

Definition: The Business Modelling Language allows the representation of information as: service offered and requested, resources, processes, business model and motivation, policies and agreement, location and event related to business and so on.

The main purpose of Business Modelling Language is to enable creation (by “business people”) and easy interchange (between business modelling tools or metadata repositories in distributed heterogeneous environment) of business models.

BML

BML Metamodel

The BML Metamodel defines an abstract syntax for the BML language using the MOF v1.4 model. Its basis are the six interrogatives - What, How, Where, Who, When and Why - of the Zachman Framework for Enterprise Architecture [ZACHMAN].

The metamodel is split up into seven packages: Core Package, BusinessOrganization Package, BusinessProcess Package, BusinessMotivation Package, BusinessLocation Package, BusinessEvent Package, BusinessObject Package.

BML Metamodel Packages

Definition: The BML Metamodel defines an abstract syntax for the BML language using the MOF v1.4 model. Its basis are the six interrogatives - What, How, Where, Who, When and Why - of the Zachman Framework for Enterprise Architecture [ZACHMAN]. For each interrogative of the Zachman Framework a corresponding package in the metamodel has been created. Moreover, an additional package containing the root meta-concepts inherited by the other packages has been created.

It is composed by a set of seven packages: Core Package, BusinessOrganization Package, BusinessProcess Package, BusinessMotivation Package, BusinessLocation Package, BusinessEvent Package, BusinessObject Package.

BML

Business Modelling Language

BML English Users

The speech community that is the group of DBE Project Partners: Italy, Greece, Germany, Great Britain, Spain and other partners.

BML Users

The speech community that is the group of all experts of the DBE who share the body of concepts about general and specific things of importance to model business.

The BML Users is of the DBE community.

The BML Users have to use their own language in order to create consistent, unambiguous and formal business models.

BSBR

Business Semantics of Business Rules

SBVR

Business Semantics of Business Rules

Business Semantics of Business Rules OMG's Request For Proposal. BSBR has been designed to support interchange of business vocabularies and business rules among organizations. This metamodel is conceptualized optimally for business people and designed to be used for business purposes independent of information systems designs. It is also intended to provide the business semantics and business rules underpinned by First Order Predicate Logic for transformations by IT staff into information system designs.

BSBR

Semantics of Business Vocabulary and Business Rules

Semantics of Business Vocabulary and Business Rules specification defines a metamodel and allows to instance it, in order to create different vocabularies and to define the related business rules.

Semantics of Business Vocabulary and Business Rules has been designed to support interchange of business vocabularies and business rules among organizations. This metamodel is conceptualized optimally for business people and designed to be used for business purposes independent of information systems designs. It is also intended to provide the business semantics and business rules underpinned by First Order Predicate Logic for transformations by IT staff into information system designs.

SBVR

community

Definition: Group of people having a particular unifying characteristic in common.

DBE

Digital Business Ecosystem

Digital Business Ecosystem

The Digital Business Ecosystem *is* a project created by the community that *is* the group of organizations, territories and business communities enabled by digital ecosystem technologies.

DBE

It is a new project that aims to develop an open-source distributed environment that can support the spontaneous evolution and composition of (not necessarily open-source) software services, components, and applications.

It is necessary that DBE creates a framework able to support the adoption of e-business by European Small and Medium Enterprises (SMEs).

It is necessary that DBE creates a new technological paradigm allowing the establishment and diffusion of Digital Business Ecosystem.

Possibility: It is possible that DBE will allow SMEs providing e-business solutions to cooperate in the design and implementation of components and applications.

DBE Concepts

The universe of discourse that *is* the set of concepts that are accepted as important in the DBE.

DBE Concepts *is relevant to* Digital Business Ecosystem

DBE Concepts *is important to* DBE Project Partner

DBE Project Partner

The speech community that *is* responsible for DBE platform and frameworks developing.

The DBE is developed by twenty DBE Project Partners.

It is necessary that DBE Project Partners has to adopt the same language.

It is necessary that DBE Project Partners has to adopt the BML Metamodel English Vocabulary.

Merriam-Webster Unabridged Dictionary

The vocabulary that is the 2004 edition, published by Merriam-Webster.

MWU

[MWU]

MWU

Merriam-Webster Unabridged Dictionary

partner

A partner is an associate who works with others toward a common goal.
business entity

SMEs

Small and Medium Enterprises

SME Software Developers

The speech community that develops software solutions compliant with specific DBE implementation.

SME Users

DBE's actor that will use specific DBE implementation for e-business.

Software SME

Software SME produce software for SMEs that want to belong to a digital ecosystem, following local specification identified by Adopting Community.

4.3 BML Core Vocabulary

BML Core Vocabulary

English

Included Vocabulary: Business Context Vocabulary

Included Vocabulary: BusinessOrganization Package

attribute

The attribute *is* a model element that is characterized by a name, a multiplicity and a attribute type.

model element

Each attribute *is in* exactly one business element.

attribute has multiplicity

is-property-of fact type

URI:

At M1 level we could instance an attribute named "Hotel Name", with a "1" multiplicity (obligatory attribute) and type equals to "text". Obviously, we should relate it to an owner class instance.

attribute has name

is-property-of fact type

attribute has attribute type

is-property-of fact type

Possibility:

An attribute *can be* integer or text.

business element

The business element *is* defined as a generic representation of an element involved in a business and it is characterized by a name (string value). It can also include a *ref* attribute in order to model a possible external reference for the business element being modelled.

model element

business element has characteristic

is-property-of fact type

business element owns a specific characteristic.

Each characteristic *is of* exactly one business element.

business element has name

is-property-of fact type

model element

The model element *is* a generic element usable in order to create a model. It is extended by business element and the attribute class.

model element has business element

is-property-of fact type

4.4 BML Business Organization Vocabulary

BML Business Organization Vocabulary

English

Included Vocabulary: Business Context Vocabulary

Included Vocabulary: BML Business Object Package

Included Vocabulary: BML Core Vocabulary

asset

The asset meta-concept represents what the business entity owns.

The asset describes both tangible assets (commodities used directly or indirectly in a production process, factories or places where value is created, people involved in business activities, ...) and intangible assets (knowledge, brands, patents, ...).

resource

URI: Know-How, Plant or People.

business entity

A business entity meta-concept represents something that has a real existence in a business context.

A business entity has an own existence independently from its functions, activities or relationships.

business element

A business entity may also be a composition of smaller entities (subunits); this relationship meets the need to represent complex organizational structure.

URI: Hotel or Room.

business entity has name

is-property-of fact type

business entity owns asset

is-property-of fact type

asset *is owned by* business entity.

business entity₁ owns business entity₂

is-property-of fact type

business entity₂ *is owned by* business entity₁.

business entity performs network role

is-property-of fact type

network role *is performed by* business entity.

Each business entity *performs* at least 0 and at most n network roles.

business entity provides business item

is-property-of fact type

business item *is offered by* business entity.

business entity *gives* business item.

Each business entity *provides* at least one and at most n business items.

business item

The [business item](#) describes the meta-concept to define the elements that an entity uses in its external relationships.

The [asset](#) describes both tangible [assets](#) (commodities used directly or indirectly in a production process, factories or places where value is created, people involved in business activities, ...) and intangible [assets](#) (knowledge, brands, patents, ...).

[resource](#)

A [business item](#) it can be offered or exchanged by a [business entity](#) within a collaboration.

URI: Document

entity

[role](#)

[business entity](#)

[business entity](#) for supplying of [products](#) and [services](#).

network

The [network](#) represents the meta-concept to describe a form of collaboration between different entities.

[business element](#)

network role

The [network role](#) aims to describe the possible ways an entity may be involved in a given [network](#).

[business element](#)

network has network role

[is-property-of fact type](#)

Each [network](#) [has](#) at least 1 and at most n [network roles](#).

owned asset

[role](#)

[asset](#)

[asset](#) that belongs to a given [business entity](#).

owner

[role](#)

[business entity](#)

[business entity](#) that owns [attributes](#) and [assets](#).

URI: Person, group of person, a company, institutes etc.

performed role

[role](#)

[network role](#)

performer

[role](#)

[business entity](#)

[business Entity](#) that is a person or thing that behaves or works in the way established.

product

[business item](#) used for describing tangible things or substances produced by natural process or manufacturer.

The [product](#) allows describing what an organization offers to its customers and [partners](#).
[business item](#)

URI: Room or Food

resource

The [resource](#) is an abstract class encompassing all the elements available for an entity to perform its business.

[business element](#)

We can distinguish between two different kind of [resource](#): [assets](#) and [business items](#).

service

[business item](#) used for describing intangible [things](#) and/or a provision or system of supplying a need.

The [service](#) allows describing what an organization offers to its customers and [partners](#).

[business item](#)

URI: SkiLesson or RoomRental

subunit

[role](#)

[business entity](#)

unit

[role](#)

[business entity](#)

unit has subunit

[partitive fact type](#)

Each [unit](#) is composed by a [set](#) of [subunits](#).

unit owns subunit

[partitive fact type](#)

[business entity](#) with the [role](#) of [unit](#) is a composition of smaller entities ([subunits](#)), this relationship meets the need to represent complex organizational structures.

Each [subunit](#) *is owned by* exactly one [unit](#).

[subunit](#) *is owned by* [unit](#).

4.5 BML Business Process Vocabulary

BML Business Process Vocabulary

English

Included Vocabulary: Business Context Vocabulary
Included Vocabulary: BML Business Object Vocabulary
Included Vocabulary: BML Core Vocabulary
Included Vocabulary: BML Business Event Vocabulary
Included Vocabulary: BML Business Organization Vocabulary

actor

person who acts and gets things done.

business entity

agreement

reciprocal engagement created between two different collaborative parties.

The agreement models an arrangement between two or more partners that specify and regulate the conditions under which they will trade, e.g., terms of shipment, terms of payment and so on.

business element

agreement performs event

is-property-of fact type

agreement causes event.

behaviour

The manner in which a business entity acts under specified conditions or circumstances or in relation to other business entities.

The behaviour is described through an abstract class that generalizes three different classes: Business process, task and transaction.

business element

Different behaviours can be related each other through a relationship, describing the order in which they are performed.

behavioural area

The behavioural area is related to the organizational working activities needed to perform a specific business.

business element

behaviour begins with event

is-property-of fact type

behaviour initiates with event.

behaviour is triggered by event

A behaviour *begins with* at least 0 and at most n events.

behaviour ends with event

is-property-of fact type

behaviour is terminated by event.

A behaviour *ends with* at least 0 and at most n events.

behaviour fulfills commitment

is-property-of fact type

commitment *is fulfilled by* behaviour.

Each behaviour *fulfills* at least 0 and at most n commitments.

behaviour generates event

is-property-of fact type

event *is generated by* behaviour.

A behaviour *generates* at least 0 and at most n events.

behaviour involves business role

is-property-of fact type

business role *is involved by* behaviour.

A behaviour *involves* at least 1 and at most n resources.

Note: A behaviour *can involve several* business role.

behaviour needs_after constraint

is-property-of fact type

It represents an end condition.

A behaviour *needs-after* at least 0 and at most n constraints.

behaviour needs_before constraint

is-property-of fact type

It represents a start condition.

A behaviour *needs-before* at least 0 and at most n constraints.

behaviour needs_during constraint

is-property-of fact type

It represents an execution condition.

A behaviour *needs-during* at least 0 and at most n constraints.

behaviour₁ precedes behaviour₂

is-property-of fact type

behaviour₂ *is preceded by* behaviour₁.

behaviour₁ *precedes* behaviour₂ if and only if the start date of behaviour₁ *is before* the start date of behaviour₂.

behaviour produces resource

is-property-of fact type

resource *is produced by* behaviour.

Each behaviour *produces* at least 0 and at most n resources.

Possibility: It is possible that behaviour *produces* more than one resource.

behaviour role

role

business entity

business entity *that* acts under specified condition or circumstances or in relation to other business entities.

business activity

task *that involves* one partner.

The business activity describes an activity performed inside the organizational boundaries. This means there aren't any interactions with other entities in order to perform a business activity.

Task

business entity performs business role

is-property-of fact type

role is performed by business entity.

business entity performs role in a generic behaviour or in an arrangement with other entities.

business process

co-ordinated set of actions *that* produces a business result, either within a single organization or across several.

A business process is a category of business model that focuses on the transformative aspect of the business – that is, value chains or sequences of functions that take raw materials or other resources and transform them in such a way to add value for people inside and/or outside the business.

behaviour

business process₁ includes business process₂

is-property-of fact type

business process₁ *contains* business process₂.

business process owns task

is-property-of fact type

task is owned by business process.

business process can encompass a certain number of tasks.

A business process *owns* at least 0 and at most n tasks.

business role

A role is the function or position that a business entity performs in a generic behaviour or in an arrangement with other entities.

business element

A behaviour can involve several business roles.

collaboration

role

collaboration activity

collaboration activity *that* refers to an (in)formal collaboration between a company and an outside entity, such as supplier, customer or competitor.

collaboration activity

multi-partner task, that is a task extended outside the organizational boundaries.

A collaboration activity allows to describe how a business entity interacts with other entities. In this context, only binary collaborations are considered.

task

collaboration activity contains transaction

is-property-of fact type

transaction *is contained in* collaboration activity.

collaboration activity *includes* transaction.

A collaboration activity *contains* at least 0 and at most n transactions.

commitment

promise to initiate a collaboration between partners in the future.

agreement

Each commitment involves a participant, that performs a specific role, and it can be fulfilled by a given behaviour.

commitments should always be reciprocated by the other trading partner, who commits to initiate a collaboration in return. To formalize this reciprocity a contract is introduced in the metamodel.

commitment establishes contract

is-property-of fact type

contract *is established by* commitment.

contract *is derived by* commitment.

A contract is introduced in the metamodel to formalize a commitment.

Each commitment *is in* exactly one contract.

Each contract *establishes* at least 2 and at most n commitments.

commitment involves business role

is-property-of fact type

business role *is involved by* commitment.

Each commitment involves a participant, that performs a specific business role.

Each commitment *is performed by* more than one business role.

commitment reserves resource

is-property-of fact type

resource *is reserved by* commitment.

Each commitment *reserves* at least 0 and at most n resources.

constraint

A constraint is a law that limits or restricts a behaviour, derived from technical or environmental aspects.

business element

There are several ways in which a constraint can impacts on a behaviour. It can represents a start condition, an end condition or an execution condition.

consumption

role

behaviour

Dictionary Basis: The act of consuming something.

contract

The contract describes a bundle of reciprocating commitments between trading partners, who bind themselves to one or more economic exchange in the future.

The contract between two or more people which creates an obligation to do, or not to do something. This agreement creates a legal relationship or right e duties.

agreement

end condition

role

constraint

constraint that must be true after the behaviour is performed.

ended behaviour

role

behaviour

behaviour characterized by an ended action or reaction of something under specified circumstances.

end event

role

event

event that characterizes the end of action.

execution condition

role

constraint

constraint that must be true while the behaviour is performed.

generated event

role

event

generator

role

behavior

behavior that generates an action or reaction of something under specified circumstances.

input

role

resource

resource that goes into the production of output.

output

role

resource

resource that is a final result of a procedure, the amount of something that a person, a machine or an organization produces.

participant

role

General Concept: business role

business role that is involved in a commitment.

process

role

General Concept: business process

set of subprocess that are involved in a business process.

Each process *contains* at least 0 and at most n subprocess.

process contains subprocess

partitive fact type

The process *includes* subprocess.

production

role

behavior

receiver

role

business role

In a transaction, it is someone who acquires something.

acquirer

reservedResource

role

resource

resource is used in behaviour

is-property-of fact type

Each resource *is used in* at least 0 and at most n behaviours.

Possibility: It is possible that resource *is used in* more than one behaviour.

sender

role

role

In a transaction is someone who transmits something.

transmitter

start condition

role

constraint

constraint that must be true before the behaviour is performed.

started behavior

role

behavior

behavior characterized by a started action or reaction of something under specified circumstances.

subprocess

role

General Concept: business process

Each subprocess *is included in* some process.

task

The task can be defined as an atomic business process unit, which actually describes some step or function.

behaviour

These process tasks can be either one-partner activities or multi-partner activities.

transaction

A transaction describes an exchange of business documents within a collaboration activity. It is characterized by a sender and a receiver (attributes with a Role value).

collaboration activity

The exchanged documents can be of various nature (paper documents, electronic documents, ...).

transaction *has* receiver

is-property-of fact type

transaction *has* sender

is-property-of fact type

trigger

role

event

event that activates or releases or causes something to happen.

4.6 BML Business Motivation Vocabulary

BML Business Motivation Vocabulary

English

Included Vocabulary: Business Context Vocabulary
Included Vocabulary: BML Business Object Vocabulary
Included Vocabulary: BML Core Vocabulary
Included Vocabulary: BML Business Organization Vocabulary

assessment

The assessment models a judgement about some influence that impacts on the organization's ability to employ its means or achieve its ends.

An assessment expresses a logical connection between influences and the ends and means of the business plans, indicating which influences are relevant to which ends and means.

motivation element

We can distinguish the following assessment typologies: "Strength" , "Weakness", "Opportunity" and "Threat!".

end

The end describes what an organization aims to achieve, without indicating how this will be reach.

motivation element

From different points of view or at different detail levels, we can identify three subtypes, such as "Vision", "Goal" and "Objective".

influence

The influence represents an act, a process or a power that produce an effect without an apparent exertion of tangible force or direct exercise of command, and often without deliberate effort or intent.

motivation element

influences can impact the enterprise in the employment of its means or in the achievement of its ends.

We can distinguish between "External" and "Internal" influences.

means

The means represents something (capability, technique, restriction, instrument, methodology, ...) used in a certain way to achieve a desired end. It does not indicate either the steps (workflow) necessary to exploit it, nor responsibility for such tasks, but it can deeply influence other business elements.

motivation element

We can distinguish among 'Mission', 'Strategy', 'Tactic', 'Policy' and 'Rule'.

URI: In the Hotel example an "Hotel" defines a "Discount Policy" and a "Fidelity Rule" as means to reach its "Customer Fidelity" end.

means impacts on business element

is-property-of fact type

means affects business element.

The means impacts on at least 0 and at most n business elements.

means is used to achieve end

is-property-of fact type

means is necessary to reach end.

motivation element

base element representing an abstraction of different motivation units.

Since all motivation elements can influence each other, the metamodel allows to establish these relationships between different motivation elements.

business element

It can be related to a business entity, in order to indicate the organization that defines a given motivational element.

motivation element has business entity

is-property-of fact type

A motivation element can be related to a business entity, in order to indicate the organization that defines a given motivational element.

Each motivation element *has* at least 0 and at most n business entity.

motivation element₁ is related to motivation element₂

is-property-of fact type

motivation element₂ is related to motivation element₁.

The motivation element₁ *is related to* at least 0 and at most n motivation element₂.

All motivation elements can influence each other (for example, we could state that an end instance is supported or is achieved by a means instance).

4.7 Business Event Vocabulary

BML Business Event Vocabulary

English

Included Vocabulary: Business Context Vocabulary
Included Vocabulary: BML Business Object Vocabulary
Included Vocabulary: BML Core Vocabulary
Included Vocabulary: BML Business Process Vocabulary

arrangement

role

General Concept: agreement

agreement duly executed and legally binding.

behaviour begins-when event

is-property-of fact type

behaviour *can be initiates by* event.

A behaviour *begins_when* at least 0 and at most n events.

Possibility: A behaviour *is trigged by* an event.

behaviour ends when event

is-property-of fact type

behaviour *can be terminated by* event.

A behaviour *ends_when* at least 0 and at most n events.

Possibility: A behaviour *is ended by* an event.

behaviour generates event

is-property-of fact type

event *is generated by* behaviour.

A behaviour *generates* at least 0 and at most n events.

Possibility: A behaviour *is ended by* an event.

business element has event

is-property-of fact type

event

The event is defined as an occurrence that impacts on organization behaviours in various ways.

business element

Possibility: It is possible that event can determine when a behaviour starts or when it ends.

Possibility: It is possible that event can be generated by a given behaviour.

event implies agreement

is-property-of fact type

event *is related to* agreement.

If an event is related to an agreement instance, the event implies an arrangement between two parties.

Each commitment *is in* exactly one contract.

Each contract *establishes* at least 2 and at most n commitments.

event₁ *precedes* event₂

is-property-of fact type

event₂ *is after* event₁.

The event₁ *precedes* event₂ if and only if the start date *of* event₁ *is before* the start date *of* event₂.

4.8 Business Location Vocabulary

BML Business Location Vocabulary

English

Included Vocabulary: Business Context Vocabulary

Included Vocabulary: BML Business Object Vocabulary

Included Vocabulary: BML Core Vocabulary

Included Vocabulary: BML Business Process Vocabulary

business element has location

is-property-of fact type

business element has path

is-property-of fact type

destination location

role

location

It is **the** location of the arrival.

location

The location represents the meta-concept to describe the position of something; in a BML context, it allows the ability to describe **the** particular site occupied by a business entity.

business element

location is from path

4

is-property-of fact type

A location **is from** at least 0 and at most 1 path.

business entity is in location

is-property-of fact type

business entity **contains** location.

The business entity **is in** at most 1 location.

path

The path describes the way used to reach a place.

business element

The metamodel allows to aggregate various paths in order to describe a more complex path and to combine in different ways subpaths already defined.

It is obligatory that path have a starting and a destination locations.

path contains subpath

partitive fact type

The path **includes** the subpath.

The metamodel allows to aggregate various paths in order to describe a more complex path and to combine in different ways subpaths already defined.

path₁ has path₂

is-property-of fact type

The path *has* at least 1 and at most *n* paths.

path is toward location

is-property-of fact type

A path *is toward* at least 0 and at most 1 location.

site

role

location

Physical position in relation to the surrounding physical building is situated.

start

role

location

location *that is the beginning of the* path.

starting location

role

location

It is *the* location of the departure.

subpath

role

General Concept: path

4.9 Business Object Vocabulary

BML Business Object Vocabulary

English

Included Vocabulary: Business Context Vocabulary

Included Vocabulary: BML Core Vocabulary

business object

A business object is an abstract class that is specialized allowing a modeller to define its own data types or to apply semantic annotation for its attributes.

business object has name

is-property-of fact type

business object has URIReference

is-property-of fact type

business type

The business type represents a generic data type that a modeller can instance in order to define its specific attribute at M1 level.

business object

business type contains property

is-property-of fact type

property *is contained in* business type.

business type *includes* property.

property *is in* business type.

business type *can own* property.

A business type *contains* at least 0 and at most n properties.

A property *is in* at least 0 and at most 1 business type.

business type has name

is-property-of fact type

business type has enumeration

is-property-of fact type

enumeration

business object whose values are the elements of a finite set of enumerators.

Business type

The enumeration is specified by defining an ordered set of enumerator labels.

enumeration literal

enumerator label used to define a specified value of an enumeration.

enumeration

The enumeration is specified by defining an ordered set of enumerator labels.

enumeration contains enumeration literal

is-property-of fact type

enumeration literal *is contained in* enumeration.

enumeration *includes* enumeration literal.

enumeration literal *is in* enumeration.

An enumeration *contains* at least 0 and at most 1 enumeration literal.

lower bound

role

number

A number equal to or less than any other number in a given set.

multiplicity

structured type

multiplicity contains two attributes, a lower bound and an (optional) upper bound, used to define an attribute multiplicity.

multiplicity has lower bound

is-property-of fact type

Each multiplicity *is characterized by* a lower bound that *has* a number value.

multiplicity has upper bound

is-property-of fact type

Possibility:

It is possible that a multiplicity *is characterized by* an upper bound that *has* a number value.

owned attribute

role

property

owned literal

role

enumeration literal

primitive

The primitive is a meta-concept that is defined as the basic building block for expressing an attribute state.

business type

property

The property represents a field owned by a business type, in order to instance user-defined structured business object types.

business type

upper bound

role

A number equal to or greater than any other number in a given set.

number

The value of upper bound *is* at least 0 and at most 1.

URIReference

The URIReference allows to use ontologies for providing additional semantics.

business object

URIReference *has* lexical form

is-property-of fact type

Each URIReference *is characterized by* a lexical form *that* *has* *a* text value.

5. Creation of a BML business model

A business model is a representation (of a business and of its environment) which is focused mainly on aims of the business and, furthermore, on terms, resources, facts, roles, rules, services, processes, organizations, locations and event related to the business.

The BML's Vocabulary and Rules define terms, facts and standard rules which specialize the SBVR metaconcepts. BML is used to create business model: the modeller specializes BML's terms and facts to define terms and facts belonging to a specific business or domain.

For example, remembering that business entity, service and their correlated fact type (business entity *provides* service) are concepts already defined in BML, if a modeler needs to model an 'Hotel' and its main service He can write:

hotel

General Concept: business entity

Definition: A public house kept for the lodging and entertainment of
travellers, or of any who wish to use its accommodation

a. based on Oxford English Dictionary ["hotel"]

hotel *provides* room rental

room rental

Definition: service offered in order to provide accommodation for customers

Each item inserted in a business model is related to a general concept already defined in the BML Vocabulary 2.0. The method to force this compatibility is tightly coupled with the design choices of a modeling-tool; for example a modelling tool could allow the user to express something, could provide a semantic rule about BML models or could provide a way to define these models in a structured form in accordance with the metamodel.

We have asserted that the specialization of the BML's concepts is a general method to create a business model; but SBVR is very versatile, it allows to import other vocabularies and it is also possible to use concepts defined in external sources to create a specific business vocabulary.

A specific business Model is based on other models (this is not a rule) which could be provided by industrial groups or social initiatives of semantic integration.

Generic Model provides domain independent concepts correlated to the general concept of business (ex. 'price', 'currency', 'customer', ...). Domain Model and Industry Model refer to a particular domain or industrial field and, in these, allow to define general concepts like "traveller", "accommodation", "travel agency", etc. Generic Business Vocabulary respects the BML rules, because it has imported the BML Vocabulary. Terms and facts can be specialized or simply used, this approach allow to share concepts and definitions with the members of the community. These considerations are justified also if we consider other external vocabularies.

Importing already defined concepts, also in not domain-specific, can produce several advantages.

For example this opportunity permits to economize time and money needed to create a new vocabulary and define the business rules.

Other benefits are correlated to the sharing of the meanings with external organizations connected with the business (like some partner which don't belong to a specific community) or with the possibility to find and adopt new procedures developed in similar businesses.

For summarizing, it is possible to choose between several methods for creating a BML Business Model:

- specializing the BML concepts;
- if the modeler needs terms and rules domain independent He can use the Generic Business Vocabulary; it can be used also as it is, because it is not only a library, but also a complete model of a generic business domain;
- importing an external vocabulary.

It is possible to choose a combination of these methods, for providing to the modeler flexibility and use facility. The choice of the right method for the creation of the Business Model is a fundamental factor for obtaining a good representation of the enterprise.

6. SBeaVeR: a tool for SBVR Vocabulary automatic development

This section illustrates a panoramic on the architecture of a BML modeling tool SBVR-based, the *SBeaVeR*. The main aim of the Generic Business Vocabulary is become integrated in the *SBeaVeR* Tool, in the section about domain-independent terms and rules.

Since SBVR is not a commercial tool, does not exist a software for the creation of SBVR Vocabularies. ISUFI – University of Lecce – is developing a Vocabulary Editor whose idea is provide an high-level support for the creation of a vocabulary based on the SBVR metamodel. The *SBeaVeR* is an integrated tool which Enable the business analysts to create business model or domain model using the SBVR language. It is necessary observe that the SBVR metamodel is a linguistic metamodel and not a MOF-compliant metamodel, its basic unit is a SBVR vocabulary: "Business Vocabulary + Rules for Business Vocabulary + Rules".

It is necessary to emphasize that this tool is much different from the editor proposed for the creation of UML-based models¹. In fact while this second software is designed for IT experts, the SBVR tool has to permit to the business people to create models using the natural language.

Because of its direction the *SBeaVeR* tool has been designed like a textual editor, in which the business modeller can create a description if a business modeller using structured sentences and business rules, thanks to a graphical interface much simple to use.

There are two internal components to implement the transformation of the model's data:

- BML validator;
- logical parser;
- MOF converter;
- XML producer.

BML Validator takes care of the management of the dictionaries in the phase of insertion. It drives the user to express itself correctly, using constructs semantically coherent. In particular it allows the creation of the four elements that constitute the vocabulary, i.e. "Terms", "Name", "Facts" and "Rules".

The windows for insertion and creation of each one of these elements has been created in according to the template provided by SBVR. Furthermore there are some functions which make easy the writing of facts and rules, with the aim to avoid the type in errors. With this

¹ Graphical modeling tool which provides an UML-like Graphical User Interface (GUI).

method it is possible to formulate a sentence in Structured English, in accordance with the basis of the formal logic upon which the SBVR is based.

The Logical Parser provides an analysis system for sentences; this system drives the interpretation of the complex logical formulations.

The MOF Converter and the XMI Producer manage the mechanical step of the modeling procedure.

In order to allow the interchange property of model BML, these two components produce a MOF/XMI implementation of the formal statement produced by the logical parser.

The MOF Converter and the XMI Producer apply the SBVR mapping rules that translate a dictionary, expressed in terms of logical formulations, in documents XML, which will be subsequently collected in the DBE Repository and used in shared and used in shared environment.

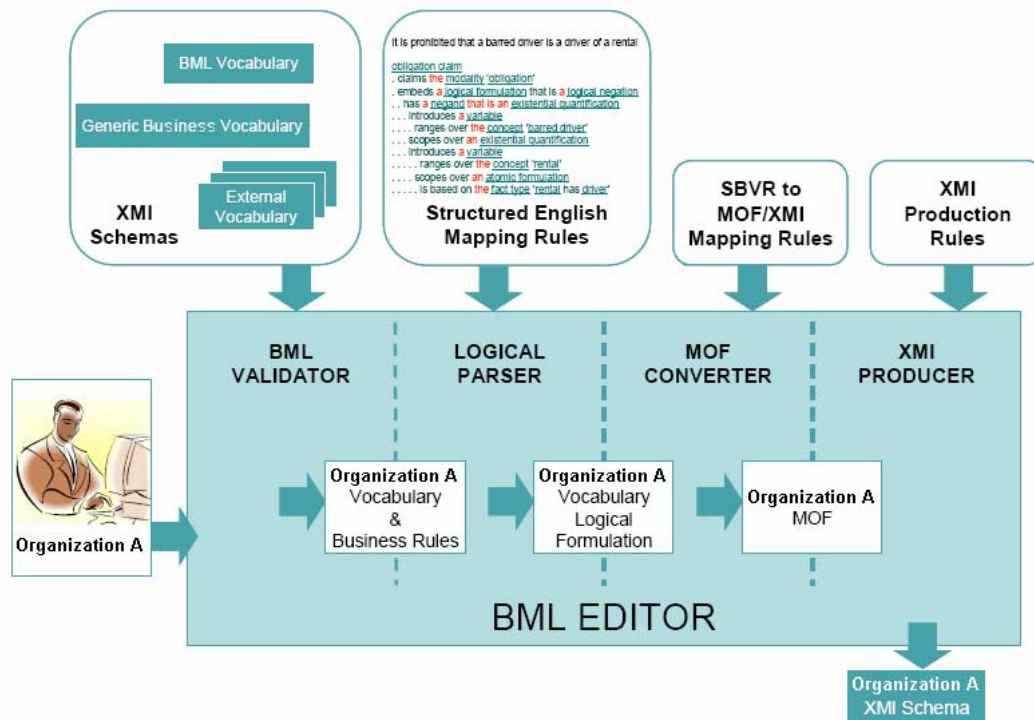


Figure 5: BML Editor

Furthermore, in order to take advantage from the great expressiveness of the BML Language, the editor (*SBeaVeR*) needs various supplemental features which allow more rich and powerful automatic interpretation of the models.

These additional tools (validators, parsers, query tools, verbalizers, wizards, content assistance processors, helpers,...) improve the utilization and the value of the editor.

As it is showed in Figure 1, the Generic Business Vocabulary aims to become an instruments of the BML editor. Indeed it can provides, to the BML Validator, further semantically coherent constructs (already defined and domain-independent) which can be used for modelling all the types of business domains.

7 Creation and populating of the Generic Business Vocabulary

Now will be described the process of the creation and populating of the Generic Business Vocabulary. This process is the same that must be adopted by the business modeler for the realization of a BML business model

a. Definition of the model

A model is composed by two parts: vocabulary and business rules. When a user creates a new model He can insert a description of the vocabulary and a definition of a Rule Set. In defining the Generic Business Vocabulary the two following steps have been followed:

Creation of the vocabulary. Its definition:

Generic Business English Vocabulary

Language: English
Included Vocabulary: BML English Vocabulary

The label 'Language' declares the language which is used in the vocabulary, English; the same default language of the SBVR.

The label 'Included Vocabulary' is used in SBVR to declare that another vocabulary is completely imported in the new described vocabulary .

The Generic Business Vocabulary entirely embody the BML Vocabulary, i.e. all the entries of the BML Vocabulary belong to Generic Business Vocabulary .

It is also possible to include more than one Vocabulary

Creation of the set of rules:

<Generic Business English Vocabulary Rules>

Vocabulary: Generic Business English Vocabulary

The label "Vocabulary" is used to declare what Vocabulary, defined in SBVR (in this case theGeneric Business Vocabulary), is used by the statements in Rule Set

b. Creation of the entries of the vocabulary.

A new entry of the vocabulary can be an Object Type, an Individual Concept or a Fact Type. Each entry describes only one concept. The notation used in the Generic Business Vocabulary is the same used in the Structured English, but also other notations can be used, because of the capability of the SBVR to being extended.

7.2.1 Creation of an Object Type

This is an example of creation of an Object Type:

organization

General Concept: [business entity](#)

Definition: [organization](#) is an instance of [business entity](#) that indicates a group of people who organize a business, [department](#), etc. in order to achieve a particular aim.

7.2.2 Creation of an Individual Concept

Example of creation of an Individual Concept, pulled out from the Generic Business Vocabulary:

Italy

Concept Type: [individual concept](#)

General Concept: [country](#)

Synonym: [IT](#)

Creation of a Fact Type

Example pulled out from the Generic Business Vocabulary:

[business process](#) [realizes](#) [strategy](#)

[business process](#) [realizes](#) [tactic](#)

7.2.3 Creation of a Fact Type

The following examples (from the Generic Business Vocabulary) show the creation of a Fact Type:

[business process](#) [realizes](#) [strategy](#)

[business process](#) [realizes](#) [tactic](#)

c. Creation of the Business Rules

A business rule is an item of the Rule Set. Each item includes a proposition and, discretionary, other information such as the name of the rule, Guidance Type, description of the rule, source, level of enforcement.

7.3.1 Guidance Type

It describes the type of the rules. The Generic Business Vocabulary uses the following types: operative business rule, operative business rule clarification, structural business rule, structural business rule clarification, structural rule, structural rule clarification.

7.3.2 Level of enforcement del Generic Business Vocabulary

Level of enforcement is a categorization scheme for the business rules defined (or adopted) by the organization which has the rules. Il name of the “level of enforcement” of the Generic Business Vocabulary is:

<Generic Business Vocabulary Levels of Enforcement>

Examples of categories used in this document:

- strict: for rules severely forced. If a rule of this type is violated there is a sanction or other effects
- deferred: severely forced but its command can be retarded. Fo example: waiting for the resources with the specified requirements.
- pre-authorized: it is a forced rule but with exeptions allowed. The authorization for its cancellation is established before-the-fact.
- post-justified: its cancellation can be post-justified (post-the-fact), if it is not approved there will be a sanction.
- override: it can be cancelled with a justification. It is necessary provide a comment when the violation occurs.
- guideline: suggested but not forced.

8 Relation between BML model and MDA

The succes of the Model Driver Achitecture is based on its power to define easily and quickly the rules and other business’s requirements in the transition from CIM to PIM and PSM.

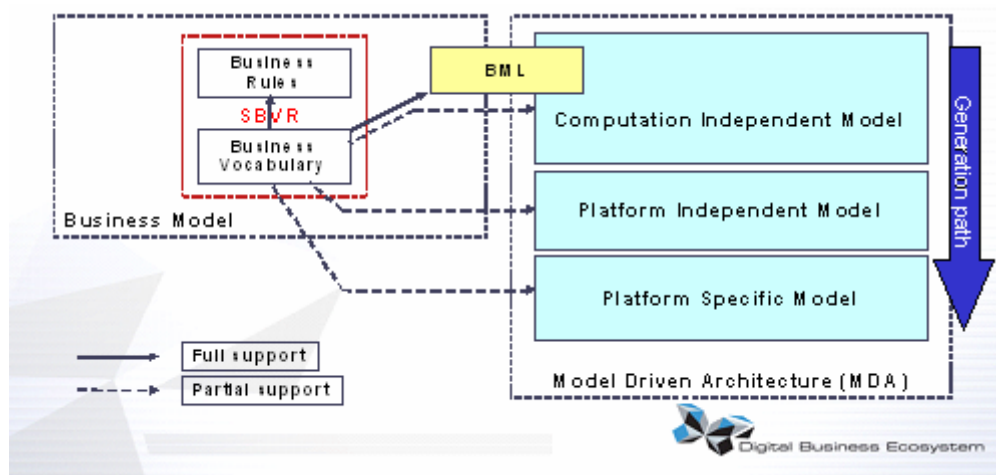


Figure 6: BML in the MDA [MDT]

Building the BML on the SBVR a linguistic support is offered, to the business people, to formally define and share the business semantic, expressed in facts and business rules, which are defined using the notation of the *Structured English*.

The SBVR approach provides to BML the capability to translate a document written in a natural language into a MOF-compliant object.

Thanks to its compatibility with MDA approach, SBVR can offer support to the Model Driven Development (MDD). The BML models SBVR-based, like the Generic Business Vocabulary, can be used in order to generate models for IT systems (PIM, PSM, diagram, source code) in a reusable and automatic way.

9 How to use the BML model

If available the right tools, methodologies and models, a generic BML model, and the Generic Business Model in this specific case, can be used for:

- structured information for other sections of the same organization or for the partners;
- structure information stored in the repository and used for driving the business and:
 - this model must be managed when its vocabulary and its business rules change;
 - check and validate its context
- input for a transformation tool to create the IT requirements.

10 Run-time specification of the business model and real-time adaptation of the IT infrastructure

An important factor for the success of the MDA is the capability in creating and modifying, quickly, the business rules between in the various layers: CIM, PIM and PSM.

The **forward path** from CIM to PIM and PSM needs to be supported by automatic transformations which, starting from a CIM model, can create the relative PIM and PSM elements in different software and system architecture. The forward path must also support the evolution of the project as a result of changes in the business and in the rules.

The **reverse path**, from PSM to CIM, support the extraction and the mapping of structures of data and legacy source code into terms, facts and business rules with the aim to facilitate the integration and the evolution of the system.

The reverse path is also vital for the CIM as basis for the validation, by the business people, of the project of system. The aim is the automatic configuration of the system which produces effects on the entire ecosystem.

11 Creation of the Generic Business Vocabulary

a. Placing of the Generic Business Vocabulary in the OMG's business modeling pyramid

The emergent needs of the eBusiness require the development of vocabularies built on standard language's metamodels.

It is necessary to remember that the modeling is a new technology in phase of development and the idea of the OMG group is providing a set of elementary items, on which analysis technique and various business notation can be based.

The business modelling pyramid shows the Business Modeling Metamodel (BML), i.e. how to build a business model:

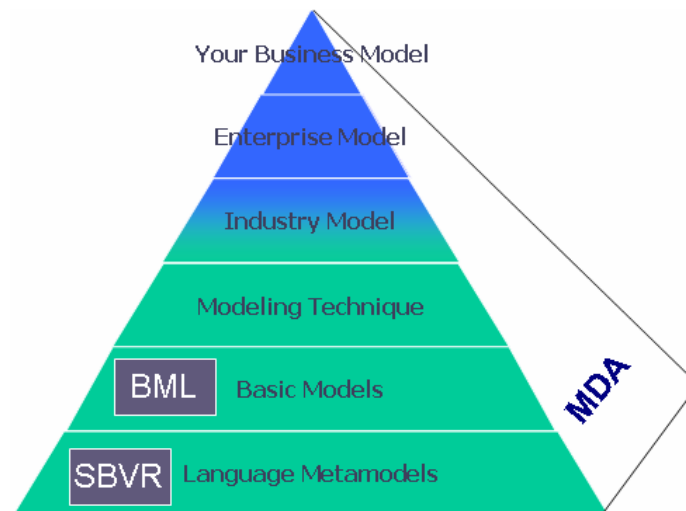


Figure 7: OMG's business modeling pyramid

In the bottom there is the fundamental package, the Semantics of Business Vocabulary and Rules (SBVR), with its own sub-packages Business Vocabulary and Business Rules. SBVR have within the logical and linguistic grounding for all the other packages.

The other packages define the standard terms, the facts, the rules, specialize the SBVR meta-concepts or extend the SBVR metamodel with additional meta-concepts.

The other levels: Basic Model which contain BML 2.0, Modeling Technique, Industry Model for several industrial sectors, Enterprise Model, Your Business Model for a specific firms.

This last layer represents a particular model of a specific project or aim, which is based on the underlying layers.

This project, the creation of the "Generic Business Vocabulary", is based on the SBVR and can be placed upon two layers: "Basic Model" (it has been constructed importing Dictionary BML 2.0) and "Industry Model".

The Generic Business Vocabulary represents a business model in a generic business domain; it contains terms (like, "Organization", "Customer", "Amount", "Quantity", "Period", "Mission", etc.) and rules which has not a level of abstraction typical for the BML Vocabulary's entry, but they are sufficiently generic to be common to whichever domain model.

Using the Generic Business Vocabulary it is possible to obtain a standardization between domains vocabulary-based, guaranteeing therefore compatibility and inter-domain interoperability.

The vocabulary's items and the rules of the BML Vocabulary 2.0 are used in the Generic Business Vocabulary. For example it contains terms like [number](#), [date](#), [text](#), [average](#), [sum](#) and provides generic structures of sentences like [number1 is greater than number2](#), [date1 precedes date2](#).

Generic Business Vocabulary can be used by modelers in different way. For example terms and facts they can be directly used or specialized in the business model. It's a serviceable tool which can simplify the creation of whichever domain vocabulary or modifying an existing one.

When a user had to create his own vocabulary He Can start from the concepts of the Generic Business Vocabulary to drawing his model.

12 The Generic Business Vocabulary: a tool for the DBE

Thinking about business modeling it is necessary to consider that the context in which it is inserted incessantly changes.

The market is global and in continuous evolution; the strategic planning does not define the business of the future, but it prepares the enterprise for the continuous change; the new functional methods must be implemented in a fast and effective way; the business processes

can be automate and the business rules can be explicit; important functions of business can be executed in outsourcing or in distant areas.

All these factors has been considered in the creation of the Generic Business Vocabulary, in particular in the choice of the sections (the structure) in which have been subdivided business voices and business rules.

13 Structure of the Generic Business Vocabulary

The domain independent business model created in this work has been organized following the next schema:

1. Company Summary: this section includes terms and rules about the organization (structure, staff, ...) and its business policy. It provides the tools for describing the organization, its structure, its divisions, its vision, its aims;
2. Markets: the vocabulary's entries and the business rules included in this section allow to model the organization's partners and its characteristics, the main competitors and its specific qualities, the tipical user, the suppliers, the vendors, the actors who participate to the business of the organization (agreements, partnerships, customers...).
3. Products/services, R&S: includes vobabulary's entries and business rules which allow the firm to descrive its own products and services, where they are produced or offered, where they are sold, their price and their characteristics
4. Production and support processes: this section includes terms and rules about production and support processes, for example sales drive and the modalities and the periods in which they come carried out.
 - 4.1 The sub-module "project" has been created with the aim to model the project with its cycle of life and all that is around to the project, included raw materials, staff, knowhow. In this section, 'Project' is only a sub-module that can be used if the organization is "Fully Projectized". If the organization is organized with the system "Functional" o "Matrix", it don't use this section, but can use all the vocabulary's entry and the business rules provided in the remaining part of the model. The Generic Business Vocabulary can be used by all types of firm, whichever is their type of organization.
5. Financial: budgets, profit. Here capital, marginal profit, liquid assets, ROI can be showed. This section is intentionally lean because the the main aim of a firm that enter a digita business ecosystem is, beyond that knowing the characteristics of the other enterprises and that that offer, also to show the own characteristics, without showing to the other enterprises (between which its competitors) the information that must be reserved.
6. Capacity: skills and facilities owned by the firm we are modeling. This section includes the equipments owned by the organization and the knowledge owned by all its employees (in all leves).
7. Personnel: experiences, positions, responsibility. In this section are listed the places, the positions covered by the personnel, the tasks assigned to everyone, in relation to the section of belongings in the enterprise.
8. Business Rules: general rules inherent the business environment in which the organization is inserted.

Each section includes the vocabulary's antries and the business rules which allow to model a specific section of the business. each item that cannot be included in some specific category,

but that is useful to all the sections, is place outside, at the beginnig of the Generic Business Vocabulary.

14 A graphical representation of the Generic Business Vocabulary

This section shows the Generic Business Vocabulary through the notation of hta BML 2.0. Using the diagrams it will be most simple to understand the meaning of the SBVR's elements and constructs.

UML, developed by the Object Management Group (OMG), is an international modelling language. It provides a formal descriptive technique for a syntactic representation of the business model and of the information system and provides also the implicit semantic understanding of the models through the UML Metamodel.

a. Decomposition of the concept “organization”

As showed in the following figure, the concept “organization” has been divided in mutually exclusive.

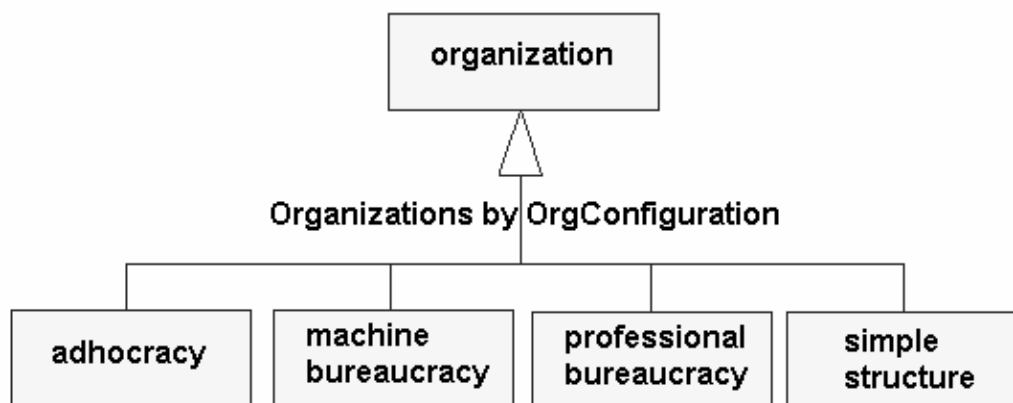


Figure 8: categories of ‘organization’

To the group of categories has been assigned the categorization scheme ‘Organizations by OrgConfiguration’, i.e. an organization is classified according to its structure. The categories has been represented by: “adhocracy”, “machine bureaucracy”, “professional bureaucracy” e “simple structure”.

b. Decomposition of the concept ‘department’

The concept of ‘departement’ denotes a decomposition of the departments in according to the role that they play in the organization.

To the group of categories has been assigned the categorization scheme ‘Department by Department Type’. The categories are: “sales department”, “service department”, “purchasing department”, “advertising department” and “personnel department”.

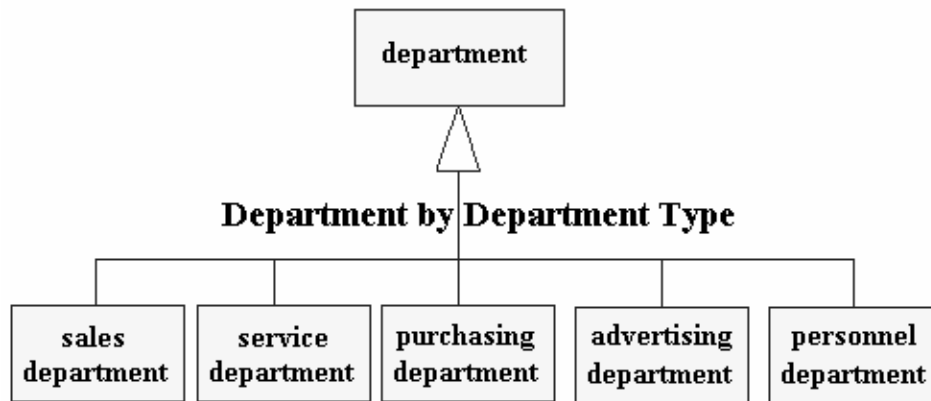


Figure 9: categories of 'department'

The Generic Business Vocabulary asserts that:

organization includes department

Synonymous Form: department is included in organization

Concept Type: partitive fact type

this fact type implies that the diagrams represented in figure 4 and figure 5 can be assembled, using the notion of aggregation, in the following way:

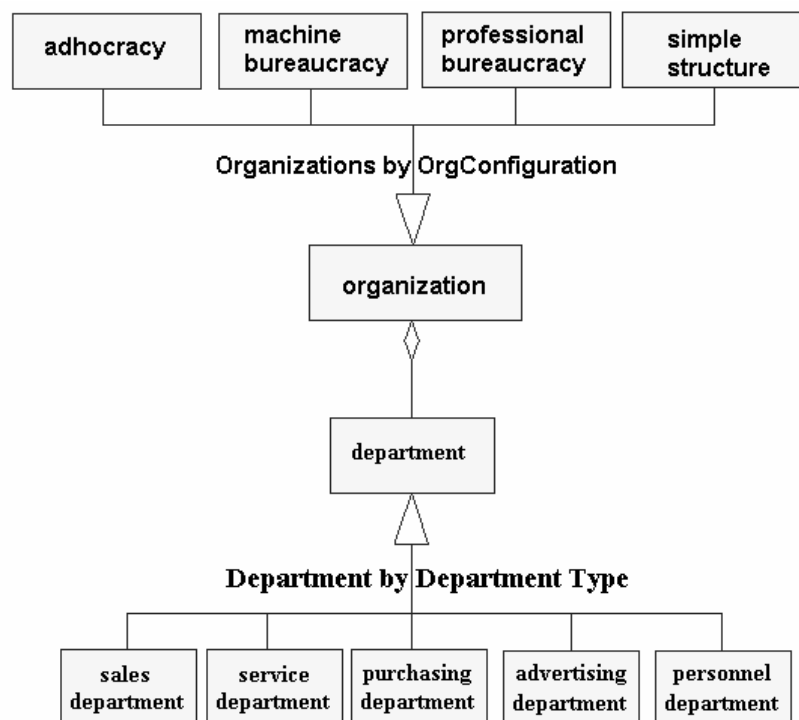


Figure 10: relation between 'organization' and 'department'

c. Decomposition of the concept 'business sector'

Also in this case, like the previous case, the categories in which the concept has been divided are mutually exclusive. To the group of categories has been assigned the categorization scheme 'Business Sector by Product/Service Type'.

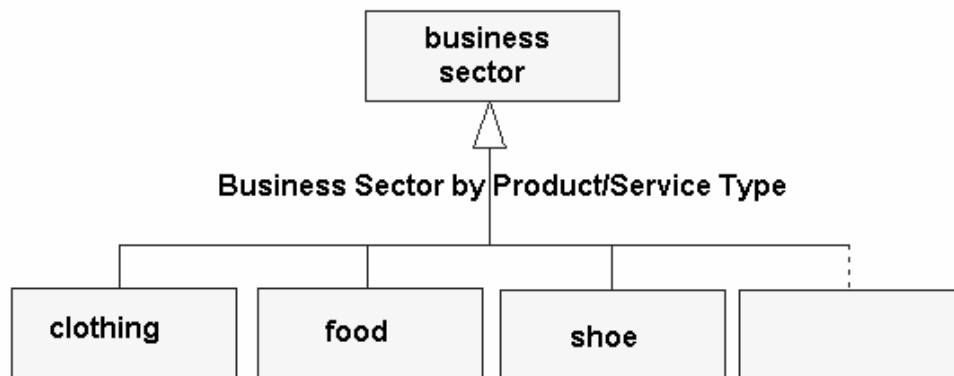


Figure 11: categorie di 'business sector'

"Business sectors" has been divided in three categories ("clothing", "food", "shoe") but other items can be added. This opportunity is provided by the SBVR's features, on which the Generic Business Vocabulary has been created and by the BML's features, imported by the Generic Business Vocabulary.

d. Decomposition of the concept 'partner'

Also in this case the categories are mutually exclusive. To this group of categories the organization scheme 'Partner by Partner Type' has been assigned, i.e. the partners are classified on the basis that they are "administrative partner", "machine value added partner", "cooperative marketing partner" ed "affiliate partner".

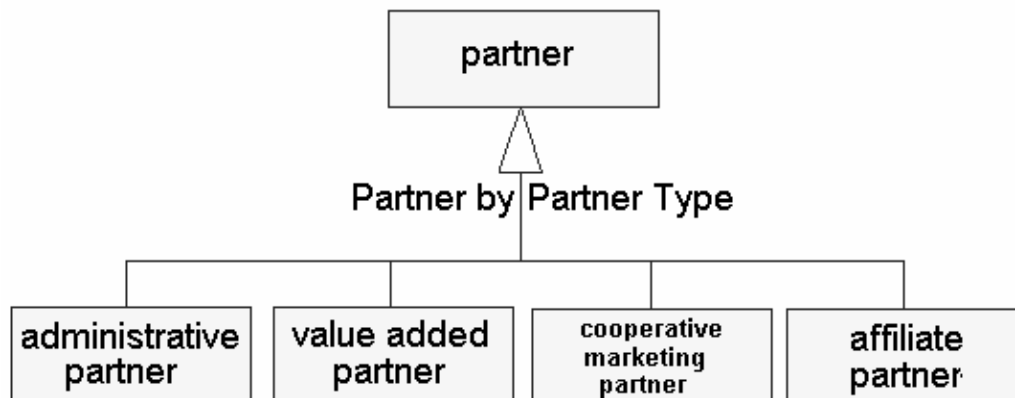


Figure 12: decomposition of concept 'partner'

e. Decomposition of the concept 'project organization structure'

The concept 'Project Organization Structure' indicates a partition of the organizations in according to the fact that the organization are 'fully projectized organization structure' (the Generic Business Vocabulary is particularly oriented to this type of organization), 'matrix organization structure' or 'functional organization structure'. To this group of categories the

categorization scheme 'Project Organization Structure by Project Organization Structure Type' has been assigned.

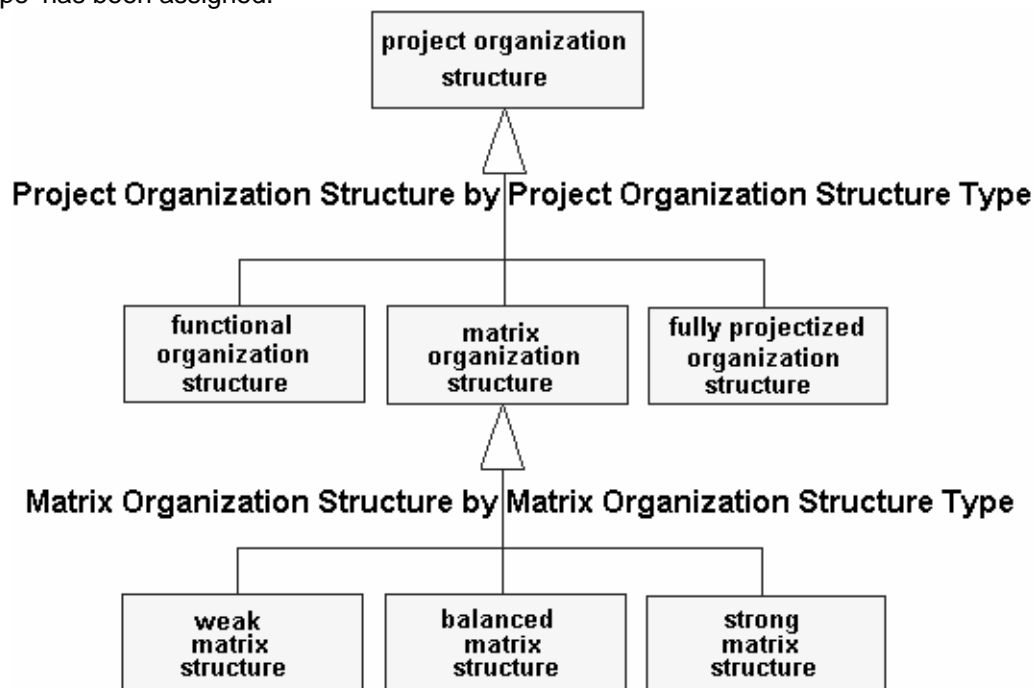


Figure 13: categories of 'project organization structure'

As showed in figure 9, the 'matrix organization structure' has thre types of categories: "weak matrix structure", "balanced matrix structure" and "strong matrix structure".

f. Decompositionm of the concept 'business process'

The concept 'business process' indicates a classification os the processes in accordino to their characteristics. To this group of categories the categorization scheme 'Business Process by Business Process Type' has been assigned.

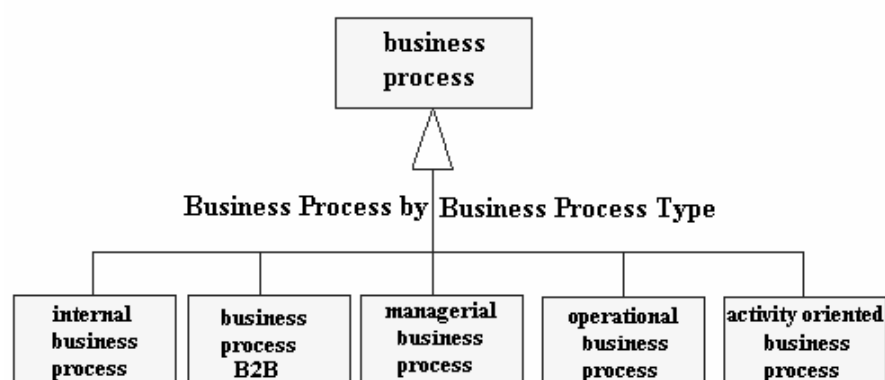


Figure 14: categories of 'business process'

The concept 'business process' have the following categories: "internal business process", which are business process internal to the organization, "business process B2B" which are business process between organizations.

The B2B business are colled "business to business transactions" and are designed through specific tools.

Other business models's categories: "managerial business process", "operational business process" (for ex.: settlement of the calls in a call center, customer's data storage, etc) and "activity oriented business process" (business processes focused on activity and transformation).

15 Types of modeled enterprise

Like already said previously, the GBV pays particular attention to the "Project" and the organized enterprises around to it.

For this reason, the organizations have been classified in relation to their orientation to the 'Project':

1. Fully Functional;
2. Matrix:
 - a. Weak Matrix
 - b. Balanced Matrix
 - c. Strong Matrix
3. Fully Projectized

a. Functional organization

In a functional organization a group of the project is composed by personnel of the same division. All the resources that the group needs belong to the functional area. If the project is related to the financial function, the project resource comes from the Financial Area. If IT, financial and legal resources are necessary, all these would have to be available inside the Financial Area.

Another way to assembling the staff for a project in a functional organization is to execute different parts of the same project in different functional areas of the organization. For example: if a project needs resources from management, ICT area and manufacturing, this project can be divided between these three areas and each team would have to execute its task, in a relatively independent way. The ICT area would have to work on its tasks, the management on its own etc., so the output of a task can be an input for another task executed by another functional area or the final work of each task can be assembled in the final product.

Often the project manager are also the functional area manager. Furthermore there is no need to negotiate the resources with other organizations, because all the resources required by the project belong to the same functional area. The members of the group acquire also applicative business competences for the project. Each member of a group can also perform other task in the functional organization, because they can be The members of the group acquire also applicative business competences for the project. Required for full time in a project.

b. Matrix organization structure

A matrix organization allow to the functional area to focus themselves on the own specific business competences and allow to the project to be supported with experts coming from different areas of the organization. For example: the database administrators can belong to the same functional area and can be assigned to work on different projects in other areas.

The main advantage of the matrix organization structure is an efficient utilization of the resources, particularly of the specialised competences which cannot be used full-time only in

a project. For example: the datamodel experts cannot be occupied full-time only in one project, but can be occupied full-time working on several project.

The main disadvantage is the complexity of the relation for the employ with more than one project manager or chief. It becomes more important, for the members of a staff, developing strong competences in the management of their time, in order to satisfy the requirements of job and the expectations of the various managers.

This type of organizational structure needs also communication and cooperation between several chief and project manager; they contend the same resources.

c. Project-based Structure

When the plans are large enough, it is possible to institute functional areas around the project group. It is particularly helpful if an high number of employees are assigned to a project for a long time.

The advantages include also a clear control, because the project manager is also the functional area chief, and a clear attention, because each person has only that project as main responsibility.

The disadvantages include the replication of the resources, because some resources must be duplicated in different project.

For example: a project can have the resource "Human Resource" replicated of a central figure "Human Resource". At the end of the project there can be several doubts about the re-allocation of the resources.

In a functional organizational structure the employees have always a task in their functional areas.

In a project organizational structure it can be not clear where to assign the resources at the end of a project.

d. Criteria adopted for classification of the enterprises

The following figure shows the criteria adopted for the classification of the enterprise in the three categories mentioned before:

Project Organization Selection Criteria			
Suggested criteria for selection of organizational structure			
	Functional	Matrix	Project
Technology	Standard	Advanced	New
Complexity	Low	Medium	High
Product frequency	Low	High	Medium
Internal interdependency	Low	Medium	High
External Interdependency	High	Medium	Low
Size	Small	Medium	Large
Importance	Low	Medium	High
Duration	Short	Medium	Long
Importance of completion date	Low	Medium	High
Uncertainty	Low	High	High
Resource limitation	Low	High	Low
Customer base	Diverse	Limited	Single

Figure 15: Criteria for classification of the enterprises [IAC]

According to this table, in the classification of an enterprise, we can use these criteria:

- **Technology:** in the functional organizational structure there is a “standard level” technology, “advanced level” for the matrix organizational structure, in the project organizational structure there is the last available technology. This criterion classifies the project organizational structure as the most advanced.
- **Complexity:** moving from the functional organizational structure to the project organizational structure there is an increase of the complexity.
- **Product frequency:** it is high in the matrix structure, low in the functional structure, medium in the project structure.
- **Internal interdependency:** in the project structure the interdependency between the functional areas is very high; in fact they have to cooperate every time. On the contrary the functional areas in the functional structure are rather independent one from the other.
- **External interdependency**
- **Size**
- **Importance**
- **Duration**
- **Importance of the completion date**
- **Uncertainty**
- **Resources limitation**
- **Customer base**

16 Influence of the organizational structures on the project

The projects belong to an organizational structure greater than the same project. Also in case of external project (ex. joint venture), they will be under the influence of the organizational structure. Also the project management style, its culture, its organizational structure can affect the project. The following paragraphs describe the fundamental aspects which impact on the project.

a. Organizational structure system

In the enterprises based on the project structure the operating tasks are mainly projects. These organizational structures are inclined to adopt management systems that facilitate the management of the project. For example: their financial management is often designed particularly to allow the management of bookkeeping and data collecting on several project simultaneously.

The organizational structure not project-based often have not suitable management systems to supporting the needs of the projects in an efficacious and efficient way. This operating deficit makes more difficult the management of a project. But in some cases this organizational structures dispose special divisions, in a lower level, which work like a project organizational structure, endowed with specific support systems. The members of the project management group have to be conscious about the impact of the organizational structure on the projects.

b. Organizational structure

The organizational structure often impacts on the availability of the resources, in a range from the 'functional type' to the 'project type', with a large range of structures's types between the two extremes.

The next figure shows fundamental characteristics of the projects in the various organizational structures.

Summary of Organizational Options					
Type	Functional	Matrix			Projectized
Characteristics		Weak	Balanced	Strong	
Project Manager's Authority	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total
% of Performing Organization's Personnel Assigned Full-time	Virtually None	0 - 25%	15 - 60%	50 - 95%	85 - 100%
Project Manager's Role	Virtually None	Part-time	Part-time	Full-time	Full-time
Common Titles for Lead Role	Coordinator	Project Coordinator/ Project Leader	Project Leader/ Project Manager	Project Manager/ Project Director	Project Manager/ Program Manager
Project Management Administrative Staff	Virtually None	Part-time	Part-time	Full-time	Full-time
Influence on Projects					

Figure 16: impact of the organizational structure on the projects [IAC]

The classical functional organizational structure is a hierarchy in which each employees has a direct chief. The personnel is grouped according to his competence area: manufacturing, marketing, management, etc.

Often the functional structures operate on projects, but the ambit of these projects is usually confined within the competences of the function.

The technical office, belonging to a functional organizational structure, executes its job independently from the other areas like manufacturing, marketing, etc.

When a pure functional organizational structure strats the development of a new product , the design phase includes only personnel belonging to the technical office.

If doubts emerge about production, these arrive for hierarchical way to the chief of the unit, which will consult the chief of the production area. Therefore the answer is forwarded, following the hierarchy, to the technical office's chief.

In the following figure, the darker rectangles represent the personnel employed in project task.

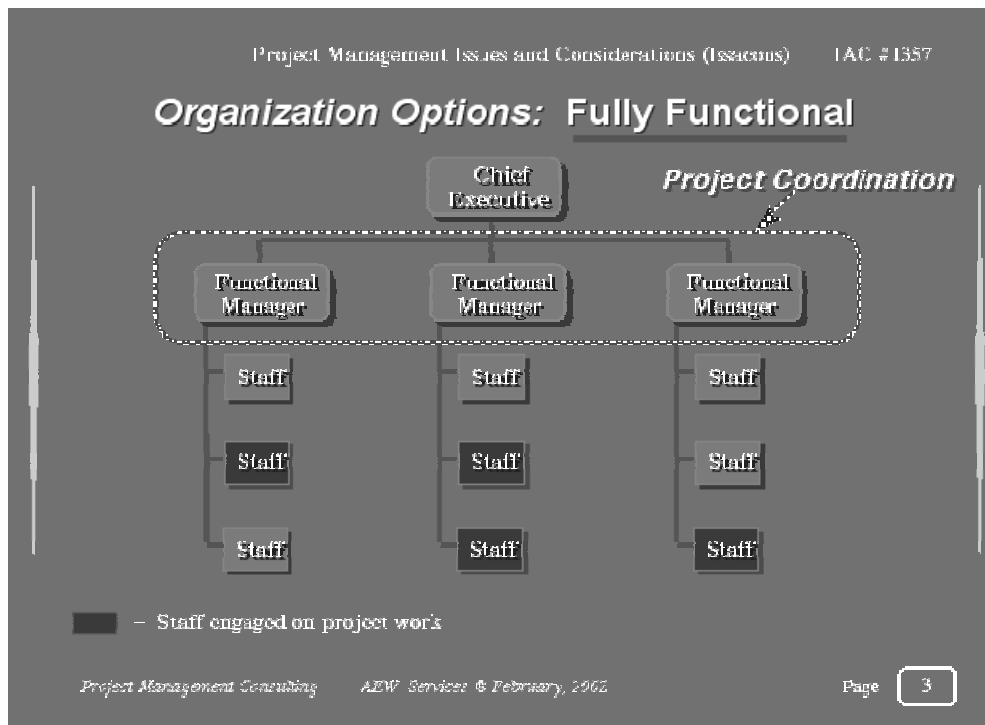


Figure 17: characteristics of a Fully Functional Organization [IAC]

On the other extrem of the range ther is the project organizational structure. In this type of organization, the members of the project group are often placed in the same office. Many resources are engaged in project activities and the project managers enjoy great autonomy and considerable authority. Often the project oriented organization have organizational areas called division, which depend directly from the manager or provide support services to the various projects.

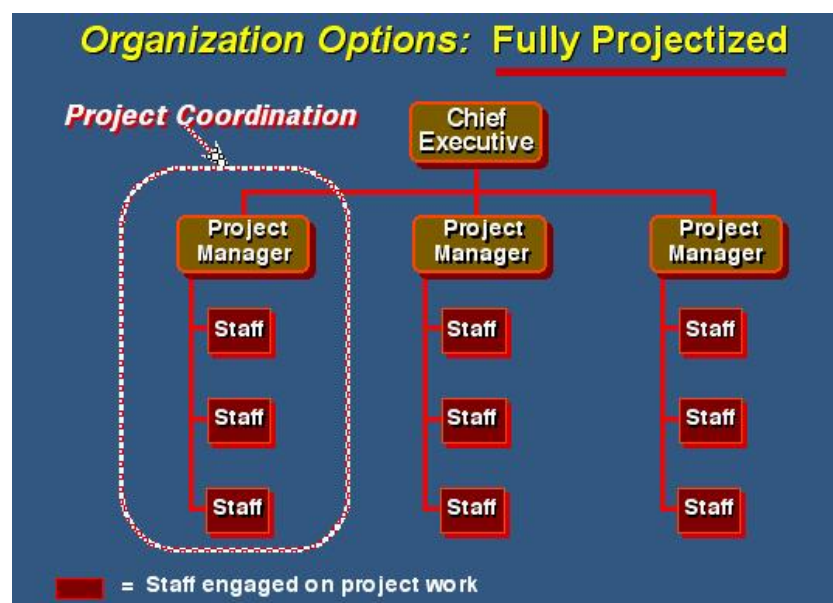


Figure 18: characteristics of a Fully Projectized organization [IAC]

The matrix organizational structures, as showed in ffigures 15,16 and 17, are a miscellaneous between funtuional and project organizations. The weak matrix structures maintain most of the characteristics of the functional organizational structures, and in this type of structure the role of the project manager is more similar to the role of a coordinator or “facilitator” than of a manager.

At the same time, the ‘strong matrices’ have many of the characteristics of the project organizations and can have project manager full-time with a considerable level of authority and full time administrative personnel.

The balanced matrix organizational structure, instead, recognizes the necessity to resort to a project manager but does not allow him the absolute authority on the project and on the relative financing .

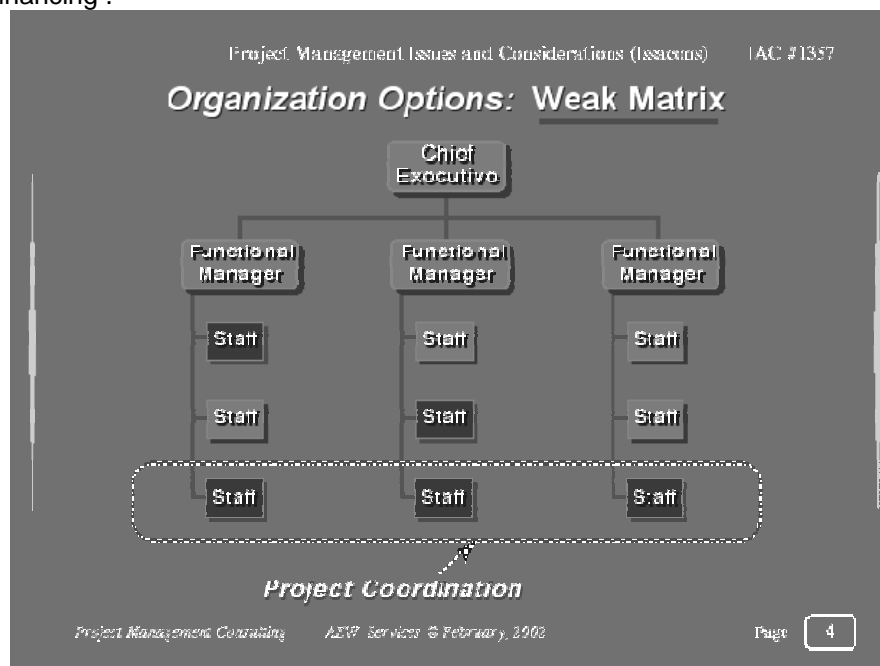


Figure 19: Weak Matrix [IAC]

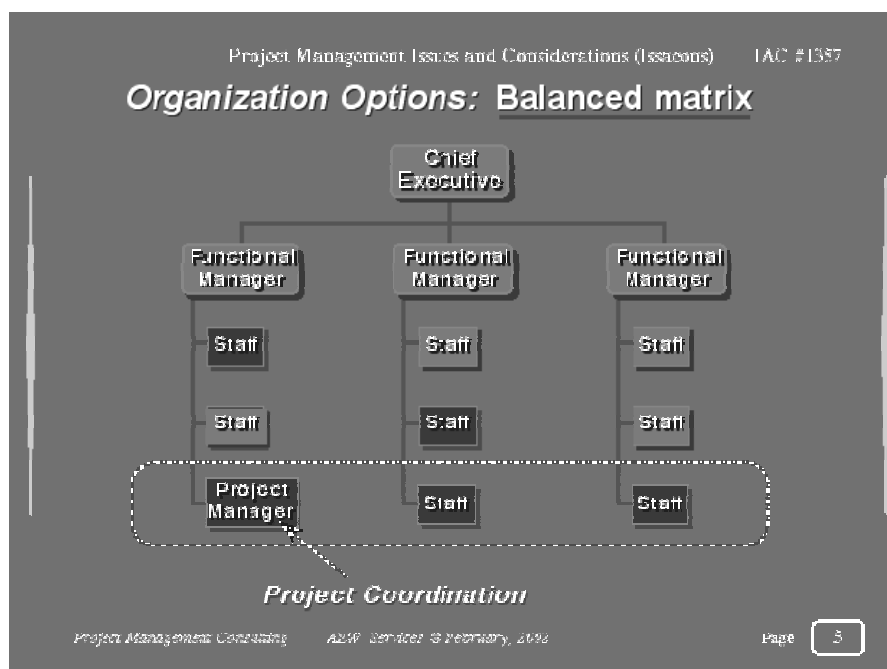


Figure 20: Balanced Matrix [IAC]

Organization Options: Strong matrix

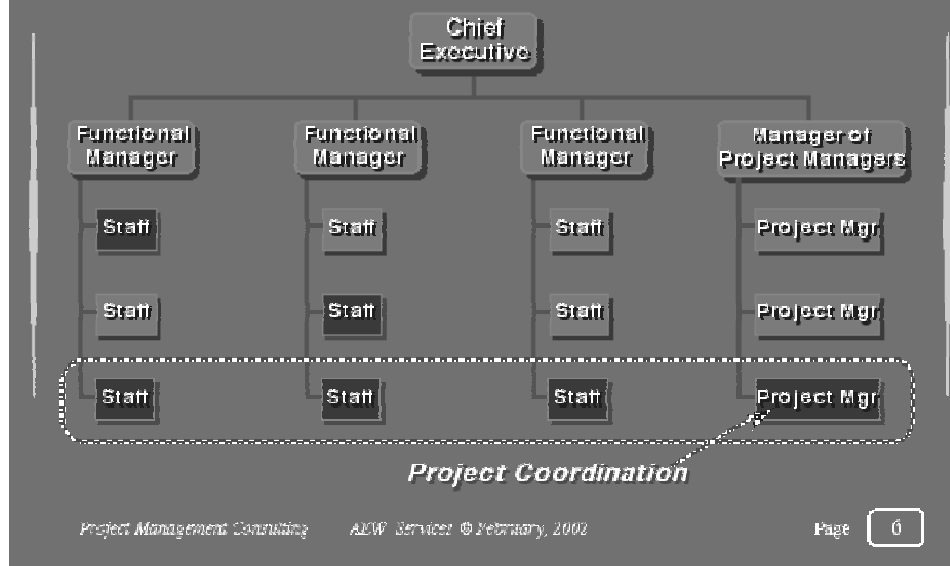


Figure 21: Strong Matrix [IAC]

This work is focused on the “Fully Projectized” structure. As we can see in figure 14, in this type of organization the authority of the project manager range from high to total and his role is full time. The rate of the trained personnel of the organization range from 85% to 100%.

The other types of organizational structures mentioned before are different from the “Fully Projectized” because of the authority of the project manager (low or unimportant in the functional organization) and for the role of the same project manager, which not exist in the functional organization, while has an increasing important in the matrix organization (from low to strong).

In the “Fully Projectized” organization (or “project oriented structure”) the resources are allocated in according to the project. Typically they are organizations that use the project as approach of business. The products are not moved from a team to the other as it happens in the functional and matrix Organizations, but they begin and end inside of the same project team, under orders of the same one project manager.

17 Organization of a generic enterprise in the Generic Business Vocabulary

The domain independent business model created, i.e. a generic enterprise inserted in a generic domain, is showed in the next figure:

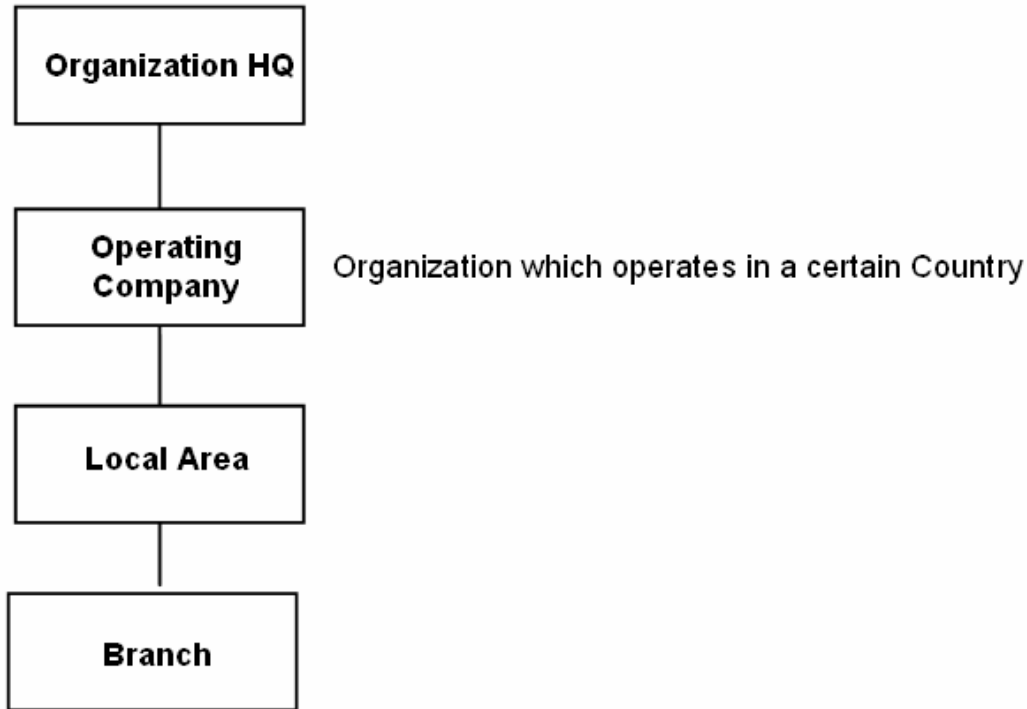


Figure 22: Organization of the modeled enterprise

The Head Quarter of the organization establishes the policy of the organization. In each Country in which the organization works, there is an Operating Company that adapts the global policy to the local rules, clients and custom, selects which types of products and services will be offers in that Country, decides the prices.

In each Country the organization manages its business through the Local Area, which contains a certain number of Branches of two types (alternative or both existing, according to the type of organization):

1. 'Production branch': branches of the organization which produces its products;
2. 'Service branch': branches of the organization which provides services.

18 How to use the Generic Business Vocabulary

The Generic Business Vocabulary has been designed to be imported in the BML Editor (tool in developing phase by ISUFI).

We can consider a scenario in which a business modeller is creating a model using the BML Editor and recall terms and rules of the Generic Business Vocabulary.

There are three way to use the Generic Business Vocabulary:

1. Terms and rules can be used *as-is*, i.e. with no changes. In this case the business modeller no needs creating new instance of the BML Vocabulary's terms.
2. the terms which the modeller needs can be obtained specialising terms from the Generic Business Vocabulary. For example, the term 'SkiSchool' is a specialization of the term 'Organization', which is already present in the Generic Business Vocabulary. To make this we can execute the following procedure:

SkiSchool

General Concept [organization](#)

Definition

3. The last way to use the Generic Business Vocabulary is unifying some of the necessary attributes for the dictionary term that is being created, choosing as 'unified term' an entry of the Generic Business Vocabulary. For example can be analyzed the case in which the 'Hotel' term has to be defined. If the Generic Business Vocabulary is not used, it is necessary to proceed in the following way:

4.

hotel

General Concept: [Business Entity](#)

Definition:

hotel **has** hotel name

Concept Type: [is-property-of fact type](#)

hotel **has** company name

Concept Type: [is-property-of fact type](#)

hotel **has** street address

Concept Type: [is-property-of fact type](#)

hotel **has** locality

Concept Type: [is-property-of fact type](#)

hotel **has** country

Concept Type: [is-property-of fact type](#)

hotel **has** phone

Concept Type: [is-property-of fact type](#)

hotel **has** fax

Concept Type: [is-property-of fact type](#)

hotel **has** e-mail

Concept Type: [is-property-of fact type](#)

hotel **has** n stars

Concept Type: [is-property-of fact type](#)

hotel **has** hotel style

Concept Type: [is-property-of fact type](#)

[hotel](#) [has](#) [hotel capacity](#)

Concept Type: [is-property-of fact type](#)

Instead following this procedure, enough long and that can appear wasteful, the Generic Business Vocabulary can be used, in which if already defined the term 'address' in the following way:

[address](#)

General Concept: [business object](#)

Definition: [It is a data type used to represent the collection of information which locates and identifies a specific address.](#)

Note: The [address](#) will be limited depending on the context in which it is used.

[address](#) [has](#) [street address](#)

Concept Type: [is-property-of fact type](#)

[address](#) [has](#) [locality](#)

Concept Type: [is-property-of fact type](#)

[address](#) [has](#) [country](#)

Concept Type: [is-property-of fact type](#)

Description: An [address](#), assigned to a person or [organization](#), also identifies the [country](#) in which he lives.

[address](#) [has](#) [phone](#)

Concept Type: [is-property-of fact type](#)

Necessity: Each [address](#) [has](#) at least one [phone](#)

[address](#) [has](#) [fax](#)

Concept Type: [is-property-of fact type](#)

[address](#) [has](#) [e-mail](#)

Concept Type: [is-property-of fact type](#)

having the term 'address' ready-made thanks to the Generic Business Vocabulary, the definition of 'Hotel' becomes more simple than in the previous case, i.e.:

hotel

General Concept: [business entity](#)

Definition:

hotel has hotel name

Concept Type: [is-property-of fact type](#)

hotel has company name

Concept Type: [is-property-of fact type](#)

hotel has address

Concept Type: [is-property-of fact type](#)

hotel has n stars

Concept Type: [is-property-of fact type](#)

hotel has hotel style

Concept Type: [is-property-of fact type](#)

hotel has hotel capacity

Concept Type: [is-property-of fact type](#)

as it is clear in the previous example, the modeling has become much short and slim with a remarkable saving of time, that is one of the main aims which had driven the design of the BML Editor. In whichever modality it is used, it is sure that the Generic Business Vocabulary is much helpful for both the domain molder and the business molder, allow them to obtain a remarkable saving of time.

a. Utilization of the 'Reference Scheme'

When some data has to be communicated through XML, it is important to consider the reference scheme. For example, in order to communicate that a certain car is owned by a certain branch, some facts have to be communicated to specifying what car and what branch. The Reference Schemes indicate what types of facts have to be used to identify anything. For example, a Reference Scheme for a car uses the vehicle identification number and the Reference Scheme for a branch uses the branch name.

In some cases, the sender and the receiver of a XML document use different reference schemes. The sender would have to provide sufficient content in a XML document to satisfy both its own and receiver's reference schemes..

Satisfying the schema of the receiver is very important for allow it to understand the schema. Satisfying the schema of the sender is very important if there is a return in the communication; the receiver must be able to satisfy the schema of the sender when their roles are inverted.

19 Advantages of the Generic Business Vocabulary

The Generic Business Vocabulary is a tool which can be helpful for the enterprise, in the context of the Digital Business Ecosystem.

The main reason for which the business modeler can decide to use the domain independent business model is the reduction of the time which can be obtained.

The business modeller can obtain further saving of time using the BML Editor with the Generic Business Vocabulary integrated.

In order to facilitate the reading of the Generic Business Vocabulary, has been made the choice to not place the voices in alphabetical order, but to organize them based on their affinities and to their mutual relations, allowing therefore a greater understanding of the model. That in order to simplify the future job of a business modeler who want to modify the Dictionary for the own scopes, modifying some terms, adding terms, enriching it with others constraints, etc.

Has been obtained a business model easy modifiable, thanks to the immediate understanding and intelligibility of it and of the relation and rules which relates the various terms.

This document has been enriched with UML representation in order to simplify the understanding and the reading to the IT experts which will use the Generic Business Vocabulary.

The model has been divided in sub-group (modules or sections). This decomposition in modules is helpful, in the phase of maintenance and modification. It allow, in fact, to find easily the interesting part of the model and modifying only that part. It is possible also, when a module become obsolete, change only that module and not the entire model.

For this purpose, it has been attempted to render each section completely independent from the others, placing outside of the sections, at the begin of the Generic Business Vocabulary, the terms common to more modules and helpful to all the sections.

The user of the DBE Community has been endowed with a tool immediately intelligible, the Generic Business Vocabulary, which, using at the same time the simplicity of a natural language and the potentiality of a formal language, allows a fast modelling of that elements of an enterprise shared by many domains.

Furthermore, the very intelligible structure allows a simple modification.

20 Generic Business Vocabulary

Generic Business Vocabulary Communities and Vocabularies

Language-independent Vocabularies

ISO Dictionary of International Symbols

Definition:	the vocabulary that is defined by ISO, of graphical symbols that have consistent meanings regardless of which natural languages they are used with
Synonym:	ISO-DIS
Reference Scheme:	ISO-DIS index
Note:	This is a fictitious standard. Work in this area is going on within ISO, but no standards have yet been published.

ISO-DIS

Synonym:	ISO Dictionary of International Symbols
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Generic Business Vocabulary English Community

Merriam-Webster Unabridged Dictionary

Definition: the [vocabulary](#) that is the 2004 edition, published by Merriam-Webster
Synonym: [MWU](#)
Reference Scheme: [MWU](#) terms

MWU

Synonym: [Merriam-Webster Unabridged Dictionary](#)

Generic Business English Vocabulary

Language: [English](#)
Included Vocabulary: [BML English Vocabulary](#)
Necessity: [Generic Business English Vocabulary](#) *incorporates* [MWU](#)
Necessity: [Generic Business English Vocabulary](#) *incorporates* [ISO-DIS](#)

Pre-defined population: [country](#)

France

Concept Type: [individual concept](#)
General Concept: [country](#)
Synonym: [FR](#)

Germany

Concept Type: [individual concept](#)
General Concept: [country](#)
Synonym: [DE](#)

Greece

Concept Type: [individual concept](#)
General Concept: [country](#)

Italy

Concept Type: [individual concept](#)
General Concept: [country](#)
Synonym: [IT](#)

Switzerland

Concept Type: [individual concept](#)
General Concept: [country](#)
Synonym: [CH](#)

UK

Concept Type: [individual concept](#)
General Concept: [country](#)
Synonym: [United Kingdom](#)

United States

Concept Type: [individual concept](#)
General Concept: [country](#)
Synonym: [USA](#)

Pre-defined population: [operating company](#)

Operating company CA

Synonymous Form: **the** [operating company](#) **that is located in** [Canada](#)

Operating company DE

Synonymous Form: **the** [operating company](#) **that is located in** [Germany](#)

Operating company IE

Synonymous Form: **the** [operating company](#) **that is located in** [Ireland](#)

Operating company UK

Synonymous Form: **the** [operating company](#) **that is located in** [UK](#)

Operating company US

Synonymous Form: **the** [operating company](#) **that is located in** [United States](#)

Operating company IT

Synonymous Form: **the** [operating company](#) **that is located in** [Italy](#)

Operating company FR

Synonymous Form: **the** [operating company](#) **that is located in** [France](#)

Pre-defined Population: [currency](#)

Euro

Concept Type: [individual concept](#)
General Concept: [currency](#)
Synonym: [EUR](#)

GBP

Concept Type: [individual concept](#)
General Concept: [currency](#)
Synonym: [British Pound](#)

USD

Concept Type: [individual concept](#)
General Concept: [currency](#)
Synonym: [United States Dollar](#)

European Union

Synonymous Form: the geopolitical area that *is composed of* [Sweden](#) and [Germany](#) and [Ireland](#) and [UK](#) and ...

address

General Concept: [business object](#)
Definition: [It is a data type used to represent the collection of information which locates and identifies a specific address.](#)
Note: The [address](#) will be limited depending on the context in which it is used.

address *has* locality

Concept Type: [is-property-of fact type](#)

address *has* country

Concept Type: [is-property-of fact type](#)
Description: An [address](#), assigned to a person or [organization](#), also identifies the [country](#) in which he lives.

address *has* street address

Concept Type: [is-property-of fact type](#)
Necessity: Each [address](#) *has* at most one [street address](#)

address *has* postal code

Concept Type: [is-property-of fact type](#)
Note: The [postal-code](#) must be composed by 5 or 9 numbers and/or letters.

amount

General Concept: [business object](#)
Concept Type: [role](#)
Definition: It is a data type used to define a number of monetary units specified in a [currency](#) where the unit of [currency](#) is explicit or implied.
Source: [UMM 'Amount']

amount has currency

Concept Type: [is-property-of fact type](#)
Necessity: Each [amount](#) *has* a [currency](#).

amount has value

Concept Type: [is-property-of fact type](#)

base charge price quantity

Concept Type: [role](#)
General Concept: [quantity](#)
Definition: The base quantity of the charge/price unit [amount](#).
Example: For a charge of five dollars/day for ten days, the charge base quantity is 1 day.

chargeable amount

Concept Type: [role](#)
General Concept: [amount](#)
Definition: [The amount on which the charge is made.](#)

chargeable quantity

Concept Type: [role](#)
General Concept: [quantity](#)
Example: The [quantity](#) on which the charge or [price](#) is made.
Example: For a charge of 5 dollars/day for ten days, the [chargeable quantity](#) is 10 days.

charge price

General Concept: [business object](#)
Definition: [It is a data type used to describe information about the Amount of money expected, required or given in payment for something.](#)
Description: A [charge price](#) *contains* [unit charge price](#)

charge price has amount

Concept Type: [is-property-of fact type](#)
Definition: The [charge price](#) *has* the [amount](#) *that* defines the quantity of money expected, required to buy a [product/service](#).

charge price has description

Concept Type: [is-property-of fact type](#)
Definition: The [charge price](#) *has* the [description](#) *that* illustrates the text providing information on [product/service](#).

charge price has tax inclusion indicator

Concept Type: [is-property-of fact type](#)
Definition: The [charge price](#) *has* the [tax inclusion indicator](#) *that* specifies an indicator that describes if the charge/[price](#) includes tax.

code

Concept Type: [role](#)
General Concept: [text](#)
Reference Scheme: [ISO 3166](#)

contact details

Definition: [address](#), telephone number and (if available) e-mail address

currency

Source: [\[MWU 2a 'currency'\]](#)
Note: Has predefined population (see above)

document

General Concept: [business item](#)
Description: It is a data type used to describe a [document](#). It is intentionally made up of a few attributes to preserve its characteristics of generality and business domain independence.

docformat

Concept Type: [categorization type](#)
Definition: [concept](#) *that specializes the concept 'document' that classifies a document* based on whether the [documents](#) is an [hardcopy](#) or a [softcopy](#).

Document by DocFormat

Definition: [segmentation](#) *that is for the concept 'document' and subdivides document* based on [docformat](#)
Necessity: [Document by DocFormat](#) *contains the categories 'hardcopy' and 'softcopy'.*

hardcopy

Concept Type: [docformat](#)
Definition: [docformat that means printed output, a permanent copy of a display document generated on an ouyput device and which can be carried away.](#)
Necessity: [hardcopy is included in](#) [Document by Docformat](#)
Synonym: digital copy.

softcopy

Concept Type: [docformat](#)
Definition: [docformat that is an electronic version of a file, usually in computer memory and/or on disk; as opposed to hardcopy, the paper printout.](#)
Necessity: [softcopy is included in](#) [Document by Docformat](#)
Synonym: papery copy

docidentifier

Concept Type: [role](#)
General Concept: [text](#)
Note: [It is a set of numbers and/or letters to identify and distinguish uniquely one document.](#)

document *has* docidentifier

Concept Type: is-property-of fact type
Necessity: Each document *has* exactly one docidentifier

document *has* name

Concept Type: is-property-of fact type
Necessity: Each document *has* at most one name.

element

Concept Type: role
General Concept: catalogue element
Possibility: It is possible that there are at least 1 and at most *n* elements

e-mail

Concept Type: role
General Concept: text
Possibility: It is possible that there is at least 0 and at most 1 e-mail

fax

Concept Type: role
General Concept: text
General Concept: It is possible that there is at least 0 and at most 1 fax

locality

Concept Type: role
General Concept: text
Description: An area with a name defined boundaries and a local government.

location

Source: [MWU (1a) 'location']

name

Concept Type: role
Concept Type: text
Source: [MWU (1a) 'name']

measurement

General Concept: business object
Definition: It is a data type used to define the measurement of an object.
Note: The measurement contains a real number determined by measuring an object along with the specified unit of measure.
Source: [UMM 'measurement']

measurement *has* unit

Concept Type: [is-property-of fact type](#)
Note: It indicates the type of unit of measure as an element of the [enumeration](#) of [unit of measure](#) (referencing UN/ECE Rec. 20)

measurement *has* value

Concept Type: [is-property-of fact type](#)

notification date/time

Concept Type: [role](#)
Definition: [date/time](#) at which something is notified to [organization](#)

payment method

Concept Type: [role](#)
General Concept: [text](#)
Dictionary Basis: relating to the act or fact of paying or being paid [MWU 'payment']
Dictionary Basis: relating to a procedure or process for attaining something [MWU 'method'].

percentage

Concept Type: [role](#)
General Concept: [real](#)
Source: [MWU 'percentage']

percentage charge price

General Concept: [business object](#)
Definition: [It is a data type used to describe a financial liability calculated using a percentage charge.](#)

percentage charge price *has* chargeable amount

Concept Type: [is-property-of fact type](#)
Definition: [The percentage charge price *has* the chargeable amount that defines the quantity on which the charge is made.](#)

percentage charge price *has* percentage

Concept Type: [is-property-of fact type](#)
Definition: [The percentage charge price *has* the percentage that is applied to the chargeable amount to find the charge/price amount.](#)

period *has* end date/time

Concept Type: [is-property-of fact type](#)

period *has* start date/time

Concept Type: [is-property-of fact type](#)

person

Source

[MWU (1a) 'person']

phone

Concept Type: [role](#)

General Concept: [text](#)

postal code

General Concept: [business object](#)

Concept Type: [role](#)

Description: [A group of letters and/or numbers which are added to a postal address to assist the sorting of mail.](#)

Definition: [It is a data type used to define the postal code that characterizes localities, cities.](#)

postal code *has* code

Concept Type: [is-property-of fact type](#)

Necessity: Each [postal code](#) *has* exactly one [code](#)

price

Source

[MWU 'price']

sale price

General Concept: [price](#)

price type

Concept Type: [categorization type](#)

Definition: [concept](#) that *specializes* the [concept](#) 'sale price' and that *classifies* a [sale price](#) based on whether the [service/product](#) will be sell to a consumer or to a stokist

quantity

Concept Type: [role](#)

Source: [ebXML 'quantity']

General Concept: [real](#)

Definition: [A number of non monetary units.](#)

quantity type

Source: [ebXML 'quantity type']

General Concept: [business object](#)

Definition: [It is a data type used to represent a number of non monetary units together with relevant supplementary information.](#)

quantity type *has* quantity

Concept Type: [is-property-of fact type](#)
Definition: [the quantity type](#) [has](#) [the quantity](#) [that](#) defines the number of non monetary units.

quantity type has unit code

Concept Type: [is-property-of fact type](#)
Definition: [the quantity type](#) [has](#) [the unit code list identifier](#) [that](#) defines the unit of the quantity.

quantity type has unit code list agency identifier

Concept Type: [is-property-of fact type](#)
Definition: [the quantity type](#) [has](#) [the unit code list agency identifier](#) [that](#) defines the agency which maintains the quantity unit code list.

quantity type has unit code list identifier

Concept Type: [is-property-of fact type](#)
Definition: [the quantity type](#) [has](#) [the unit code list identifier](#) [that](#) defines the quantity unit code list.

boolean

General Concept: [enumeration](#)
Definition: Defines an [enumeration](#) that denotes a logical condition.
Source: [UMM 'boolean']

real

General Concept: [primitive](#)
General Concept: It is a classifier element that is an instance of [primitive](#), representing the predefined type of [real](#). An instance of [real](#) is an element in either the [set](#) of rational numbers or the [set](#) of irrational numbers.
Source: [UMM 'real']

street address

Concept Type: [role](#)
General Concept: [text](#)
Description: [The name of a street or thoroughfare.](#)

strength

General Concept: [assessment](#)
Description: It is an instance of [assessment used to describe an advantage within the enterprise that helps it in achieving some ends or in employing some means.](#)
Example: "the resource quality of branch managers ".

strength has expression

Concept Type: [is-property-of fact type](#)
Synonymous Form: [expression is used to describe a particular strength.](#)

tax identifier

Concept Type: [role](#)
General Concept: [VAT Number](#)
Definition: [The registered national tax identification of a organization.](#)

tax inclusion indicator

Concept Type: [role](#)
General Concept: [boolean](#)
Definition: It is an indicator specifying if the [charge price](#) includes tax.

traveling mean

Description It indicates some transportation means

traveling mean *has* traveling mean type

Synonymous Form: [traveling mean type *is for* traveling mean](#)

traveling mean type

Concept Type: [categorization type](#)
Definition: [concept *that specializes the concept 'traveling mean'*](#)

airplane

General Concept: [traveling mean type](#)
Definition: [the airplane](#) defines the name of the available national and international airlines to reach out a particular place.

bus

General Concept: [traveling mean type](#)
Definition: [the bus](#) defines the number of the available bus line to reach out a particular place.

car

General Concept: [traveling mean type](#)
Definition: [the car](#) defines the available car model in a car rental.

ship

General Concept: [traveling mean type](#)
Definition: [traveling mean that is a sailing vessel having a bowsprit and usually three masts each composed of a lower mast, a topmast, and a topgallant must.](#)
Definition: [the ship that](#) defines the available shipping company to reach out a particular place.

train

General Concept: [traveling mean type](#)
Definition: [traveling mean provided by a line of railway cars coupled together and drawn by a locomotive.](#)
Definition: [the train that](#) defines the name of the available railway company to reach out a particular place.

unit

Concept Type: [role](#)
General Concept: [unit of measure](#)
Source: [UMM 'unit']

unit charge price

General Concept: [business object](#)
Definition: [It is a data type used to describe a financial liability calculated using a per unit charge or price for a quantity.](#)

unit charge price has amount

Concept Type: [is-property-of fact type](#)
Definition: [The unit charge price has the amount that defines the charge/price amount per unit.](#)

unit charge price has base charge price quantity

Concept Type: [is-property-of fact type](#)
Definition: [Each unit charge price has at least one base charge price quantity.](#)

unit charge price has chargeable quantity

Concept Type: [is-property-of fact type](#)
Synonymous Form: [chargeable quantity is linked to unit charge price](#)

unit charge price is included in charge price

Concept Type: [partitive fact type](#)
Necessity: [Each unit charge price is included in at least one charge price.](#)

unit code

Concept Type: [role](#)
Source: [ebXML 'quantity unit code']
General Concept: [text](#)
General Concept: [The unit of the quantity.](#)

unit code list agency identifier

Concept Type: [role](#)
Source: [ebXML 'quantity unit code list agency identifier']
General Concept: [text](#)
Definition: [The agency which maintains the quantity unit code list.](#)

unit code list identifier

Concept Type: [role](#)
Source: [ebXML 'quantity unit code list identifier']
General Concept: [text](#)
Definition: [The quantity unit code list.](#)

unit of measure

Source:	[UMM 'unit of measure']
General Concept:	It defines an enumeration of units of measure used in international trade. Its enumeration literals refer to UN/ECE Recommendation 20.

value

Concept Type:	role
Source:	[UMM 'value']
General Concept:	real
General Concept:	The number of monetary units as an instance of real.
Necessity:	It is necessary that the number of decimal places must be limited to two.

VAT-Number

General Concept:	business object
Definition:	It is a data type used to indicate the VAT-Number that distinguishes a company.

weakness

General Concept:	assessment
Description:	It is an instance of assessment used to indicate some area of inadequacy within the enterprise that hampers it in achieving some ends or in employing some means.
Example:	"an old technology infrastructure ".

weakness has expression

Concept Type:	is-property-of fact type
Description:	expression contains a description of all weaknesses.

web site

Concept Type:	role
General Concept:	text
Possibility:	It is possible that there is at least 0 and at most 1 website

1) Company Summary:

organization

General Concept:	business entity
Definition:	organization is an instance of business entity that indicates a group of people who organize a business, department , etc. in order to achieve a particular aim.
Definition:	A company, corporation, firm or enterprise, whether incorporated or not, public or private.

Definition: In business, government, and other kinds of endeavor, the collective functioning of a group to achieve [mission](#), [goals](#) and [objectives](#).

Definition: The administrative or executive structure of a business or [project](#).

Reference Scheme: [name of organization](#)

Reference Scheme: [tax identifier](#)

Reference Scheme: [VAT-Number](#)

organization has name

Concept Type: [is-property-of fact type](#)

Description: The [organization](#) *has* a [name](#) that is used to identify an [organization](#)

Necessity: [It is necessary that each organization has exactly one name](#)

organization has reg country

Concept Type: [is-property-of fact type](#)

Concept Type: The [organization](#) *has* the [reg country](#) that is used to identify a [nation](#). [reg country](#) is used to identify the centre seat of an [organization](#)

Necessity: [It is necessary that each organization has exactly one reg country](#)

organization has tax identifier

Concept Type: [is-property-of fact type](#)

Description: The [organization](#) *has* the [tax identifier](#) that is used to identify it.

Necessity: [It is necessary that each organization has exactly one tax identifier](#)

orgconfiguration

Concept Type: [categorization type](#)

Source: H.Mintzberg

Definition: [concept](#) that *specializes* the [concept](#) '[organization](#)' and that *classifies* an [organization](#) by its [structure](#)

See: [structure](#)

organization has orgconfiguration

Concept Type: [is-property-of fact type](#)

Necessity: [It is necessary that each organization has exactly one orgconfiguration](#)

structure

Synonym: [orgconfiguration](#)

organization has structure

Concept Type: [is-property-of fact type](#)

Necessity: [It is necessary that each organization has exactly one structure](#)

adhocracy

Concept Type: [orgconfiguration](#)

Source: [H.Mintzberg](#)
Description: [orgconfiguration](#) that *has* a highly organic [structure](#), with little formalization of behavior; job specialization based on formal training; a tendency to group the specialists in functional units for housekeeping purposes but to deploy them in small, market-based project teams to do their work; a reliance on liaison devices to encourage mutual adjustment, the key coordinating mechanism, within and between these teams.
Necessity: [adhocracy is included in Organization by OrgConfiguration](#)

machine bureaucracy

Concept Type: [orgconfiguration](#)
Source: [H.Mintzberg](#)
Description: [orgconfiguration](#) that is a clear configuration of the design parameters has held up consistently in the research: highly specialized, routine operating tasks; very formalized procedures in the operating core; a proliferation of rules, regulations, and formalized communication throughout the organization; large-sized units at the operating level; reliance on the functional basis for grouping tasks; relatively centralized power for decision making; and an elaborate administrative structure with sharp distinctions between line and staff.
Necessity: [machine bureaucracy is included in Organization by OrgConfiguration](#)

professional bureaucracy

Concept Type: [orgconfiguration](#)
Source: [H.Mintzberg](#)
Description: [orgconfiguration](#) that relies for coordination on the standardization of skills and its associated design parameter, training and indoctrination. It hires duly trained and indoctrinated specialists -professionals- for the operating core, and then gives them considerable control over their work. Control over his own work means that the professional works relatively independently of his colleagues, but closely with the clients he serves. Most necessary coordination between the operating professionals is handled by the standardization of skills and knowledge - in effect, by what they have learned to expect from their colleagues.
Necessity: [professional bureaucracy is included in Organization by OrgConfiguration](#)

simple structure

Concept Type: [orgconfiguration](#)
Source: [H.Mintzberg](#)
Description: [orgconfiguration](#) that has little or no technostructure, few support staffers, a loose division of labor, minimal differentiation among its units, and a small managerial hierarchy. Little of its behavior is formalized, and it makes minimal use of planning, training, and liaison devices.
Necessity: [simple structure is included in Organization by OrgConfiguration](#)

Organization by OrgConfiguration

Definition: segmentation that *is for* the concept 'organization' and *subdivides* organization based on orgconfiguration

Necessity: Organization by OrgConfiguration *contains* the categories 'adhocracy', 'machine bureaucracy', 'professional bureaucracy' and 'simple structure'.

operating country

Concept Type: role

Definition: country in which organization does business

operating company

Definition: operating company of the organization

Note: In each operating country the organization has an operating company that:

- adapts global policy to local regulation, custom and practice
- selects which products/services will be sold/offered
- sets tariffs

Note: Has pre-defined population (above)

local area

Concept Type: organization function

Definition: organization unit that *has* area management responsibility

Description: a local area contains a number of branches

local area is included in operating company

Concept Type: partitive fact type

Necessity: It is necessary that each local area *is included in* exactly one operating company

Synonymous Form: operating company *includes* local area

operating company operates in operating country

Necessity: It is necessary that each organization site *is located in* exactly one operating country.

organization site

Concept Type: role

Definition: location *used by* organization

organization site is base for organization unit

Synonymous Form: organization unit *is based at* organization site

hours of operation

Definition: the times during which a branch is open for business

Example: 7 days a week; 24 hours per day; 8:00 am to 19:00 pm; on demand...

non-organization location

Concept Type: role
Definition: location that *is not the* location *of a* rental organization unit

branch

Concept Type: organization function
Definition: organization unit that *has* product creation/service training responsibility
Necessity: the concept 'branch' is included in Organization Units by Function
Reference Scheme: the country and the name *of the* branch

branch has country

Necessity: The country *of a* branch *is* the operating country *of the* operating company that *includes* the local area that *includes* the branch.

branch has hours of operation

Concept Type: is-property-of fact type

branch has name

Concept Type: is-property-of fact type

branch is included in local area

Concept Type: partitive fact type
Necessity: Each branch *is included in* exactly one local area.

branch type

Concept Type: categorization type
Definition: concept that *specializes* the concept 'branch' and that *classifies* a branch by its branch type

Branches by Type

Definition: segmentation that *is for* the concept 'branch' and *subdivides* branches based on branch type
Necessity: Branches by Type *contains* the categories 'production branch' and 'service branch'.

production branch

Concept Type: branch type
Definition: branch that *has* a location and where is obtained a finished product
Necessity: production branch *is included in* Branches by Type

service branch

Concept Type: branch type
Definition: branch that *has* a location and where is trained the personnel

Necessity [service branch](#) *is included in* [Branches by Type](#)

enterprise

Definition: an [organization](#) that exists to perform a specific [mission](#) and achieve associated [goals](#) and [objectives](#).

Definition an enterprise is 'any entity engaged in an economic activity, irrespective of its legal form'.

tactic

General Concept: [means](#)

General Concept: [shorter and narrower in scope than a strategy; we can state that the former implements the latter, even if this distinction is never very marked and need a deep knowledge about business context.](#)

Note: [tactic](#) is a plan formulated to achieve [objectives](#)

Example "provide each member of the sales force with a palmtop"

Reference Scheme a [proposition](#) that *corresponds to the* [tactic](#)

tactic has proposition

Concept Type: [is-property-of fact type](#)

Description: [proposition is used to describe a specific tactic](#)

mission

General Concept: [means](#)

Description It is an instance of [means, capturing what the business or will be doing on a day-to-day basis to make a Vision operative.](#)

Note: [mission](#) is usually expressed by a generic a very simple statement containing action, [product/service](#) and market/[customer](#).

Example "provide consulting services to European SMEs".

Reference Scheme a [proposition](#) that *corresponds to the* [mission](#)

mission has proposition

Concept Type: [is-property-of fact type](#)

Description: [proposition is used to describe a specific mission.](#)

business policy has proposition

Concept Type: [is-property-of fact type](#)

Description: [proposition is used to describe a specific business policy](#)

strategy

General Concept: [means](#)

Description [strategy is a long-term and broad plan describing all the elements \(things, processes, locations, people, timing\) used to achieve some business goals; in other words, it represents a planning of the mission.](#)

Reference Scheme a [proposition](#) that *corresponds to the* [strategy](#)

strategy has proposition

Concept Type: [is-property-of fact type](#)

Description: [proposition is used to describe a specific strategy](#)

goal

General Concept:	<u>end</u>
Description	It is an instance of <u>end</u> , representing a desired result focused toward a specific business aspect and long-term oriented.
Example	<u>"to improve customer satisfaction over the next five years"</u>
Synonymous Form:	<u>objective</u>
Reference Scheme	a <u>proposition</u> that <i>corresponds to</i> the <u>goal</u>

goal *has* proposition

Concept Type:	<u>is-property-of fact type</u>
Description:	<u>proposition is used to describe a specific goal</u>

objective

General Concept:	<u>end</u>
Description	It is an instance of <u>end</u> , representing a desired result focused toward a specific business aspect and long-term oriented.
Description	<u>goals</u> of the <u>organization</u> that can be measured in some quantitative way. (e.g., "Decrease cost by 15%". "Become the supplier with the lowest rate of returned products").
Synonymous Form:	<u>goal</u>
Reference Scheme	a <u>proposition</u> that <i>describes</i> the <u>objective</u>

objective *has* proposition

Concept Type:	<u>is-property-of fact type</u>
Description	<u>proposition is used to describe a specific objective</u>

technology

Definition	Tools to assist in the execution of the business strategy
Definition	Automation of business functions to accelerate the <u>business process</u>

value proposition

Definition	a clear statement of who the target market for a particular <u>product</u> is, of what key benefits the <u>product</u> will deliver, and of the price that will be charged.
Reference Scheme	a <u>proposition</u> that <i>describes</i> the <u>value proposition</u>

value proposition *has* proposition

Concept Type:	<u>is-property-of fact type</u>
Description	<u>proposition is used to describe a specific value proposition</u>

directorate

Definition	a body of directors taken jointly.
Definition	Individuals elected by a <u>corporation's shareholders</u> to oversee the <u>management</u> of the corporation. The members of a <u>directorate</u> are paid in cash and/or <u>stock</u> , meet several times each year, and assume legal responsibility for corporate activities.

management team

patent

Definition	a special right given to the inventor of a machine or process
General Concept:	Business Item
Synonym:	copyright

2) Markets:

market

Definition	A market is a 'meeting place' where organizations and individuals can exchange services or products . A market is defined in terms of the types of services and products that are likely to be exchanged. The "Yellow Pages" in a telephone book is an example of classifications of products and services, e.g. 'Legal Services', or 'Air condition products'
Source	[ebXML]

means

Concept Type:	role
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business process

General Concept:	business object
Definition	business processes are a set of activities involved within or outside an organization that work together to produce a business outcome for a customer or to an organization .
Definition	A group of logically related activities that use the resources of the organization to provide defined results in support of the organization's objectives . In the Rational Unified Process, we define business processes using business use cases, which show the expected behavior of the business, and business use-case realizations, which show how that behavior is realized by business workers and business entities.
Description:	An organization may have specific goals , aims and targets to be achieved. For products to be manufactured or sold or serviced, there are several activities involved with this organization like employees recruitment, machineries installation, purchasing goods, manufacturing of products , selling and servicing the product to consumers/vendors , collecting the payments and implementing government's rules etc., and these activities collectively are called as business processes .
Source:	[UMM 'Business Process']

business process type

Concept Type:	categorization type
Definition	concept that <i>specializes</i> the concept ' business process ' and that <i>classifies</i> a business process by its business process type
Necessity:	Each business process <i>has</i> at most one business process type

Business Process by Business Process Type

Definition:	<u>segmentation</u> that <i>is for</i> the <u>concept</u> ' <u>business process</u> ' and <i>subdivides</i> <u>business processes</u> based on <u>business process type</u>
Necessity:	<u>Business Process by Business Process Type</u> <i>contains</i> the categories ' <u>internal business process</u> ', ' <u>business process B2B</u> ', ' <u>managerial business process</u> ', ' <u>operational business process</u> ' and ' <u>activity oriented business process</u> '.

internal business process

Concept Type:	<u>process types</u>
Definition:	<u>business processes</u> that are within an <u>organization</u>
Example:	product manufacturing
Necessity:	<u>internal business process</u> <i>is included in</i> <u>Business Process by Business Process Type</u>

business process B2B

Concept Type:	<u>process types</u>
Definition:	<u>business processes</u> that are between <u>organizations</u> . These are called business to business transactions and are done through application interfaces.
Example:	mortgage sales by a mortgage company and escrow(payment of insurance and taxes) servicing for that mortgage done by some other company.
Necessity:	<u>business process B2B</u> <i>is included in</i> <u>Business Process by Business Process Type</u>

managerial business process

Concept Type:	<u>process types</u>
Definition:	<u>business processes</u> that are managerial.(HR and Recruitment process)
Necessity:	<u>managerial business process</u> <i>is included in</i> <u>Business Process by Business Process Type</u>

operational business process

Concept Type:	<u>process types</u>
Definition:	<u>business processes</u> that are operational
Example:	service calls attended in call centers, information stored by bank tellers regarding opening an account etc.
Necessity:	<u>operational business process</u> <i>is included in</i> <u>Business Process by Business Process Type</u>

activity oriented business process

Concept Type:	<u>process types</u>
Definition:	<u>business processes</u> that are activity oriented
Example:	the transformations that takes place in a data warehouse.
Necessity:	<u>activity oriented business process</u> <i>is included in</i> <u>Business Process by Business Process Type</u>

business process *has* name

Concept Type:	<u>is-property-of fact type</u>
Necessity:	Each <u>business process</u> <i>has</i> at most one <u>name</u>

business process realizes strategy

business process realizes tactic

business sector

Definition: A group of business companies that have shared characteristics, usually operating in a common industry.

business sector type

Concept Type: categorization type
Definition: concept that specializes the concept 'business sector' and that classifies a business sector based on the type of product/service it produces/offers.

clothing

Concept Type: business sector type
Note: the meaning of clothing is clothing sector
Definition: business sector that encompasses all retail outlets, services including small clothes shops, department stores and wholesale stores, etc.
Necessity: clothing is included in Business Sector by Product/Service Type

food

Concept Type: business sector type
Note: the meaning of food is food sector
Definition: business sector that encompasses all retail outlets, services and catering including small food stores, restaurant, fast food, supermarkets, etc.
Necessity: food is included in Business Sector by Product/Service Type

shoe

Concept Type: business sector type
Note: the meaning of shoe is shoe sector
Definition: business sector that manufactures and sells shoes.
Necessity: shoe is included in Business Sector by Product/Service Type

Business Sector by Product/Service Type

Definition: segmentation that is for the concept 'business sector' and subdivides business sector using business sector type
Necessity: Business Sector by Product/Service Type contains the categories 'clothing' and 'food' and 'shoe'.

business domain

Definition: a sphere of business knowledge, influence, or activity
Definition: a distinctive and manageable business area that shares a set of common characteristics

business domain *has* expression

Concept Type: is-property-of fact type
Description: expression is used to describe a specific business domain

business domain *has* name

Concept Type: is-property-of fact type
Necessity: Each business domain *has* at most one name

business area

Definition: a business area is a collection of process areas
Example: manufacturing, retail, financial, transport, services

business area *is included in* business domain

Concept Type: partitive fact type
Synonymous Form: the business area *is a member of* the business domain
Necessity: Each business area *is included in* exactly one business domain.
Synonymous Form: business domain *includes* business area
Synonymous Form: business area *is in* business domain
Synonymous Form: business domain *owns* business area
Necessity: Each business area *is owned by* exactly one business domain

business area *has* expression

Concept Type: is-property-of fact type
Description: expression is used to describe a specific business area

business area *has* scope

Concept Type: is-property-of fact type
Necessity: Each business area *has* at least one scope

business area *has* business opportunity

Concept Type: is-property-of fact type
Necessity: Each business area *has* at least one business opportunity

process area

Definition: a process area is a collection of business processes
Example: marketing, ordering, distribution, settlement, regulatory

process area *is included in* business area

Synonymous Form: the process area *is a member of* the business area
Concept Type: partitive fact type
Necessity: Each process area *is included in* exactly one business area.
Synonymous Form: business area *includes* process area
Synonymous Form: process area *is in* business area

process area *has* expression

Concept Type: is-property-of fact type

stakeholder

Definition: A person or group of people who have a vested interest in the success of an [organization](#) and the environment in which the [organization](#) operates: internal clients, management, employees, administrators, etc. A [project](#) may also have external [stakeholders](#), including suppliers, investors, community groups and government organization.

Definition: Specific people or groups who have a stake in the outcome of the [project](#)

Definition: Anyone who has a vested interest in the [project](#)

buyer

Concept Type: [role](#)

General Concept: [business entity](#)

Source: [MWU 'buyer']

Reference Scheme: the [contact details](#) and the [name](#) of the [buyer](#)

buyer has contact details

Concept Type: [is-property-of fact type](#)

Necessity: Each [buyer](#) *has* at most one [contact details](#)

customer

Concept Type: [role](#)

General Concept: [business entity](#)

Definition: The person or group that is the direct beneficiary of a [product](#) or [service](#). The people for whom the [product](#) is being undertaken

Reference Scheme: the [contact details](#) and the [name](#) of the [customer](#)

customer has contact details

Concept Type: [is-property-of fact type](#)

Necessity: Each [customer](#) *has* at most one [contact details](#)

customer state

Concept Type: [characteristic type](#)

Concept Type: [category of \[the concept\] 'customer' that classifies a customer based on the degree of fidelity he is gained in the long time relationship with the hotel, bank, and so on.](#)

customer being old

Concept Type: [customer state](#)

Definition: [customer being in the business transaction records for a given amount of time.](#)

customer being new

Concept Type: [customer state](#)

Definition: [customer that will perform a business transaction for the first time.](#)

corporate customer

Definition: relating or belonging to a corporation [MWU 'corporate']
Definition: person or company who buys goods and services [MWU 'customer']

corporate rental agreement *has* maximum rental duration

Concept Type: is-property-of fact type

partner *has* name

Concept Type: is-property-of fact type
Necessity: Each partner *has* at most one name

partner *has* contact details

Concept Type: is-property-of fact type
Necessity: Each partner *has* at most one contact details

partner state

Concept Type: characteristic type

partner *being new*

Concept Type: partner state
Definition: new partner, i.e. partner that has never been in the business partner records

partner *being old*

Concept Type: partner state
Definition: partner that has been in the business partner records for a given amount of time.

partner type

Concept Type: categorization type
Definition: concept that specializes the concept 'partner' and that classifies a partner based on whether it is an administrative partner, a value added partner, a cooperative marketing partner, or an affiliate partner.
Source: [UMM 'PartnerType']

Partner by Partner Type

Definition: segmentation that is for the concept 'partner' and subdivides partner using partner type
Necessity: Partner by Partner Type contains the categories 'administrative partner', 'value added partner', 'cooperative marketing partner' and 'affiliate partner'.

administrative partner

Concept Type: partner type
Necessity: administrative partner is included in Partner by Partner Type

Definition [administrative partners](#) provide contract administration between the end [customer](#) and the [organization](#) or other [partners](#). This is particularly useful for those situations where the end [customer](#) must hold contracts with a local company

value added partner

Concept Type: [partner type](#)
 Necessity: [value added partner](#) *is included in* [Partner by Partner Type](#)
 Definition: A [value added partner](#) provides [services](#) and/or [products](#) cooperatively with the [organization](#) to deliver solutions.

cooperative marketing partner

Concept Type: [partner type](#)
 Necessity: [cooperative marketing partner](#) *is included in* [Partner by Partner Type](#)
 Definition: A [cooperative marketing partner](#) performs marketing and sales in cooperation with other [partners](#) to identify and secure [customer](#) opportunities. You know your market best. This may include geography, business customs, key contacts, marketing and sales channels, applications, methodologies, and more. These partners makes sales calls, gives technical presentations, formulates solutions...

affiliate partner

Concept Type: [partner type](#)
 Necessity: [affiliate partner](#) *is included in* [Partner by Partner Type](#)
 Definition: An [affiliate partner](#) acts to coordinate and manage [customer](#) accounts and activities within a region; potentially managing one or more other [partners](#). An [affiliate partner](#) may participate in all of the above [partner](#) roles, depending on the situation. [affiliate partners](#) are established by invitation only.

deliverer has contact details

Concept Type: [is-property-of fact type](#)
 Necessity: Each [deliverer](#) *has* at most one [contact details](#)

deliverer

Concept Type: [role](#)
 General Concept: [business entity](#)
 General Concept: [It is a data type used to represent a deliverer but just the "role" not the person.](#)
 Reference Scheme: [the person that is a deliverer for the organization](#)
 Reference Scheme: [the contact details and the name of the deliverer](#)

deliverer being old

Concept Type: [deliverer state](#)
 Definition: [deliverer being in the business transaction records for a given amount of time.](#)

deliverer being new

Concept Type: deliverer state
Definition: deliverer
Definition: deliverer *that will perform a business transaction for the first time.*

deliverer has name

Concept Type: is-property-of fact type
Necessity: Each deliverer *has* at most one name

competitor

Concept Type: role
General Concept: business entity
General Concept: It is a data type used to represent a competitor for the organization
Reference Scheme: *the* contact details *and the* name *of the* competitor

competitor has name

Concept Type: is-property-of fact type
Necessity: Each competitor *has* at most one name

competitor has contact details

Concept Type: is-property-of fact type
Necessity: Each competitor *has* at most one contact details

competitive advantage

competition

Definition: rivalry between businesses that are operating in the same market

agreement has location

Concept Type: is-property-of fact type

agreement has duration

Concept Type: is-property-of fact type

agreement has scope

Concept Type: is-property-of fact type

agreement has authority and responsibilities of each partner

Concept Type: is-property-of fact type

agreement has *Character of partners (general or limited, active or silent)*

Concept Type: [is-property-of fact type](#)

agreement type

Concept Type: [categorization type](#)
Description: [concept](#) that *specializes* the [concept](#) 'agreement' based on [type](#).
Source: [UMM 'AgreementType']
Necessity: Each [agreement](#) *has* at most one [agreement type](#)

Agreement by Agreement Type

Definition: [segmentation](#) that *is for the* [concept](#) 'agreement' and *subdivides* [agreement](#) using [agreement type](#)
Necessity: [Agreement by Agreement Type](#) *contains* the [categories](#) 'cooperative agreement', 'licensing agreement', 'credit agreement', 'material transfer agreement', 'confidentiality agreement', 'letters of intent agreement', 'agreement on commercial operations', 'agreement on sponsored research/unrestricted grants', 'option agreement' and 'agreement on the assignment of rights'.

cooperation agreement

Concept Type: [agreement type](#)
Necessity: [cooperation agreement](#) *is included in* [Agreement by Agreement Type](#)

licensing agreements

Concept Type: [agreement type](#)
Definition: an agreement between two enterprises allowing one to sell the other's products or services and to use their name, sales literature, [trademarks](#), copyrights, etc. in a limited manner.
Necessity: [licensing agreement](#) *is included in* [Agreement by Agreement Type](#)

credit agreement

Concept Type: [agreement type](#)
Necessity: [credit agreement](#) *is included in* [Agreement by Agreement Type](#)

material transfer agreement

Definition: [agreement types](#)
Necessity: [material transfer agreement](#) *is included in* [Agreement by Agreement Type](#)

confidentiality agreement

Concept Type: [agreement type](#)
Necessity: [confidentiality agreement](#) *is included in* [Agreement by Agreement Type](#)

letters of intent agreement

Concept Type: [agreement type](#)
Necessity: [letters of intent agreement](#) *is included in* [Agreement by Agreement Type](#)

agreement on commercial operations

Concept Type: [agreement type](#)
Note: are included commissioned research and clinical trials
Necessity: [agreement on commercial operations](#) *is included in* [Agreement by Agreement Type](#)

agreement on sponsored research/unrestricted grants

Concept Type: [agreement type](#)
Necessity: [agreement on sponsored research/unrestricted grants](#) *is included in* [Agreement by Agreement Type](#)

option agreement

Concept Type: [agreement type](#)
Necessity: [option agreement](#) *is included in* [Agreement by Agreement Type](#)

agreement on the assignment of rights

Concept Type: [agreement type](#)
Necessity: [agreement on the assignment of rights](#) *is included in* [Agreement by Agreement Type](#)

partner participates agreement

Necessity: Each [agreement](#) *has* at least two [partners](#)

contract-document

General Concept: [business item](#)
Definition: It is a data type used to describe a [contract](#).
Note: [It](#) is intentionally made up of a few attributes to preserve its characteristics of generality and business domain independence.

contract is manifested in contract-document

Concept Type: [associative fact type](#)
Necessity: Each [contract](#) *is manifested in* exactly one [contract-document](#)

partner is responsible for contract

partner participates commitment

arrangement

Concept Type: [role](#)
General Concept: [agreement](#)
Definition: [agreement duly executed and legally binding.](#)

consortium

General Concept:
Definition

business entity

an association between two or more companies to work together on a specific **project** (usually a major construction or engineering project):

business transaction

Definition:

A **business transaction** is a set of business information and business signal exchanges amongst two commercial **partners** that must occur in an agreed format, sequence and time period. If any of the **agreements** are violated then the transaction is terminated and all business information and business signal exchanges must be discarded. Business Transactions can be formal as in the formation of on-line offer/acceptance commercial contracts and informal as in the distribution of product announcements.

Source

[ebXML 'Business Transaction']

barrier to entry

General Concept:
Definition:

business object

conditions that create difficulty for competitors to enter the market. For example, copyrights, **trademarks**, patents, dedicated distribution channels and high initial investment requirements.

General Concept:

any factor which prevents new competition from entering a market

opportunity

General Concept:
Definition:
Description:

assessment

a situation with future potential

It is an instance of **assessment used to model a favorable impact of the external environment on achieving some organizational ends or in employing some organizational means**

Example:

"lack of competitors".

Example:

"Japan represents a great opportunity for our new"

opportunity has expression

Concept Type:
Description:

is-property-of fact type

expression is used to illustrate a specific opportunity

threat

Definition:
Example:

a potential danger to the interests of a company

deregulation of the market is a real threat to established telecom operators

threat has expression

Concept Type:
Description:

is-property-of fact type

expression is used to illustrate a specific threat

market *has* threat

Concept Type: is-property-of fact type

productivity

Definition: the relationship between the output of goods and resources needed to produce

demand

General Concept: business object

Definition: the quantity required to supply orders

supplier

Concept Type: role

General Concept: business entity

Source: [MWU 'supplier']

Reference Scheme: the contact details and the name *of* the supplier

supplier *has* name

Concept Type: is-property-of fact type

Necessity: Each supplier *has* at most one name

supplier *has* contact details

Concept Type: is-property-of fact type

Necessity: Each supplier *has* at most one contact details

supplier *supply* product

supply contract

General Concept: contract

Necessity: It is a construct modeling representing an agreement to supply a specific product

supplier *has* supply contract

Concept Type: is-property-of fact type

Necessity: Each supplier *has* almost one supply contract

supply contract *establishes* delivery

Necessity: It is necessary that each supply contract *sets* some deliveries

Note: The terms of the contract fix the ordered product and the quantity

supply contract *establishes* remuneration

Synonymous Form: supply contract *fixes* remuneration.

Necessity: Each supply contract *has* exactly one remuneration

delivery

General Concept: commitment

Source: [MWU 'delivery']

delivery has ordered product

Concept Type: is-property-of fact type
Synonymous Form: delivery supplies some ordered product.

delivery involves participant supplier

Synonymous Form: supplier carries out delivery

delivery has delivered quantity

Concept Type: is-property-of fact type
Necessity: Each delivery has some quantities

delivered quantity

Concept Type: role
General Concept: quantity
Description: It represents the quantity sent to the customer

merger

Definition: the creation of a new company by joining two separate companies

sale

Definition: the value of the products and services sold during a period
Definition: An exchange of products, services, or other property for money.

division

See: department

department

General Concept:
Definition: a distinct, usually specialized division of a large organization;
Definition: a division of a business specializing in a particular product or service
Synonym: division

organization includes department

Synonymous Form: department is included in organization
Concept Type: partitive fact type

department type

Concept Type: categorization type
Definition: concept that specializes the concept 'department' and that classifies a department by its functional role in organization

Department by DepartmentType

Definition: segmentation that is for the concept 'department' and subdivides department based on department type
Necessity: Department by DepartmentType contains the categories 'sales department', 'service department', 'purchasing department', 'advertising department' and 'personnel department'.

sales department

Concept Type: department type
Definition: the type of department responsible for the activity of selling products and services to customers
Necessity: sales department is included in Department by DepartmentType

service department

Concept Type: department type
Definition: the type of department that provides customer services
Necessity: service department is included in Department by DepartmentType

purchasing department

Concept Type: department type
Definition: the type of department responsible for purchases
Necessity: purchasing department is included in Department by DepartmentType

advertising department

Concept Type: department type
Definition: the type of department that is responsible for advertising
Definition: the type of department that provides customer services
Necessity: advertising department is included in Department by DepartmentType

personnel department

Concept Type: department type
Definition: the type of department that is responsible for personnel
Necessity: personnel department is included in Department by DepartmentType

3) Products/services, R&S

product has expression

Concept Type: is-property-of fact type
Description: expression is used to describe a specific product

product has grado di innovatività (basso, medio, alto)

product has modelli di prodotto

product has price

Concept Type: is-property-of fact type

product has production branch

Concept Type: [is-property-of fact type](#)

ordered product

Concept Type: [role](#)

General Concept: [product](#)

Definition: [product](#) requested from the clients to the [organization](#)

Possibility: It is possible that are requested at least 1 and at most n [ordered products](#).

service has expression

Concept Type: [is-property-of fact type](#)

Description: [expression](#) is used to describe a specific service

service has price

Concept Type: [is-property-of fact type](#)

service has service branch

Concept Type: [is-property-of fact type](#)

brand

Definition: the identity of a [product](#) or [service](#)

product has brand

Concept Type: [is-property-of fact type](#)

Description: [brand](#) is used to identify a specific product

service has brand

Concept Type: [is-property-of fact type](#)

Description: [brand](#) is used to identify a specific service

trademark

Definition: the name of a [product](#) or [service](#) that has been legally registered as the property of an enterprise.

catalogue

General Concept: [business item](#)

Definition: It defines a list of [product/service](#) descriptions.

catalogue element

Description: It defines an element of a [catalogue](#). In particular it is the description of a [product/service](#).

Necessity: Each [catalogue element](#) *is contained in* almost 1 [catalogue](#)

catalogue element type

Concept Type: [categorization type](#)

Definition [concept that specializes the concept 'catalogue element' and that classifies a catalogue element based on whether it is a catalogue element-product or a catalogue element-service.](#)

Catalogue Element by Catalogue Element Type

Definition [segmentation that is for the concept 'catalogue element' and subdivides catalogue element using catalogue element type](#)
Necessity [Catalogue Element by Catalogue Element Type contains the categories 'catalogue element-product' and 'catalogue element-service'.](#)

catalogue element-product

General Concept: [product](#)
Concept Type: [catalogue element type](#)
Description: It defines an element of a [catalogue](#). In particular it is the description of a [product](#).
Necessity: [catalogue element-product is included in Catalogue Element by Catalogue Element Type](#)

catalogue element-service

General Concept: [service](#)
Concept Type: [catalogue element type](#)
Description: It defines an element of a [catalogue](#). In particular it is the description of a [service](#).
Necessity: [catalogue element-service is included in Catalogue Element by Catalogue Element Type](#)

catalogue element has currency

Concept Type: [is-property-of fact type](#)

catalogue element has description

Concept Type: [is-property-of fact type](#)
Necessity: [Each catalogue element has exactly one description](#)

catalogue element has price

Concept Type: [is-property-of fact type](#)
Necessity: [Each catalogue element has at most one price](#)

4) Production and support processes

promotion

Definition: a method of communicating and publicising a [product](#)

promotional campaign

Definition: a coordinated series of promotional efforts built around a single theme and designed to achieve a specific [objective](#)

Definition: The total planned, coordinated sales effort on behalf of a specific client or [product](#), often multimedia in nature and run over a period of time.

Reference Scheme: the [name](#) of the [promotional campaign](#) and the

[promotional campaign](#) [has](#) [name](#)

Concept Type: [is-property-of fact type](#)

Necessity: each [promotional campaign](#) [has](#) exactly one [name](#)

[promotional campaign](#) [start date/time](#)

General Concept: [start date/time](#)

Definition: [start date/time](#) [of a](#) [promotional campaign](#)

[promotional campaign](#) [end date/time](#)

General Concept: [end date/time](#)

Definition: [end date/time](#) [of a](#) [promotional campaign](#)

[promotional campaign](#) [has](#) [promotional campaign start date/time](#)

Concept Type: [is-property-of fact type](#)

Necessity: each [promotional campaign](#) [has](#) exactly one [promotional campaign start date/time](#)

[promotional campaign](#) [has](#) [promotional campaign end date/time](#)

Concept Type: [is-property-of fact type](#)

Necessity: each [promotional campaign](#) [has](#) exactly one [promotional campaign end date/time](#)

4.1) Project

[project organization structure](#)

Definition: A structure that defines the reporting relationships, processes, systems and procedures of the [project](#).

Description: Issues typically important in the structuring of a [project](#) include the degree of project/functional orientation, the extent of the project management (office) authority, collocation of project members, the allocation of [resources](#), work packaging and interface management, and the definition of control, authorization and reporting procedures and systems. There are three basic kinds of organization structure: Functional, Matrix, Project.

The choice of structure should take account of cultural and environmental influences and may change as the [project](#) evolves through the [project life cycle](#) and because of different types and conditions of [contract](#).

Description: [projects can be organized in a lot of different ways: functional, matrix \(weak, balanced, strong\) and projectized](#)

[project organization structure type](#)

Concept Type: [categorization type](#)
 Definition: [concept that specializes the concept 'project organization structure' and that classifies a project organization structure based on whether it is functional, matrix, fully projectized](#)

Project Organization Structure by Project Organization Structure Type

Definition: [segmentation that is for the concept 'project organization structure' and subdivides project organization structure using project organization structure type](#)
 Necessity: [Project Organization Structure by Project Organization Structure Type contains the categories 'functional organization structure', 'matrix organization structure' and 'fully projectized organization structure'.](#)

functional organization structure

Concept Type: [project organization structure type](#)
 Definition: The form of [organization](#) in which all people with a particular kind of skill (such as engineering) are grouped in a common [department](#), reporting to a single manager for that particular functional specialty.
 Definition: An organization structure in which [staff](#) are grouped hierarchically by specialty e.g., production, marketing, engineering, and accounting at the top level; engineering, further divided into mechanical and electrical.
 Definition: The hierarchical organization of a [staff](#) according to their specialty.
 Description: in a [functional organization structure](#) the [resources](#) are controlled totally from within their respective functional unit. The [project manager's](#) authority is little or none. The percentage of performing organization's [personnel](#) assigned full-time to the project is virtually none. The project manager's role is virtually none.
 Necessity: The common title for lead role is coordinator.
[functional organization structure is included Project Organization Structure by Project Organization Structure Type](#)

matrix organization structure

Concept Type: [project organization structure type](#)
 Definition: where [resources](#) are controlled functionally by their functional head and concerning their [project](#) requirements by the [project manager](#).
 Description: [matrix organization structure is composed by weak matrix structure, balanced matrix structure, strong matrix structure.](#)
 Necessity: [matrix organization structure is included Project Organization Structure by Project Organization Structure Type](#)

matrix organization structure type

Concept Type: [categorization type](#)
 Definition: [concept that specializes the concept 'matrix organization structure' and that classifies a matrix organization structure based on whether it is weak, balanced, strong](#)

Matrix Organization Structure by Matrix Organization Structure Type

Definition	<u>segmentation that is for the concept 'matrix organization structure' and subdivides matrix organization structure using matrix organization structure type</u>
Necessity	<u>Matrix Organization Structure by Matrix Organization Structure Type contains the categories 'weak matrix structure', 'balanced matrix structure' and 'strong matrix structure'.</u>

weak matrix structure

General Concept:	<u>matrix organization structure type</u>
Definition:	<u>matrix organization structure where the project has a team leader in each functional department and the products are passed from one</u>
Necessity:	<u>weak matrix structure is included Matrix Organization Structure by Matrix Organization Structure Type</u>

balanced matrix structure

General Concept:	<u>matrix organization structure type</u>
Definition:	<u>matrix organization structure where the project has a team leader in each functional department and the products are passed from one team to the next. Furthermore, the project has a project manager for project coordination. The project manager is one of the team leaders.</u>
Necessity:	<u>balanced matrix structure is included Matrix Organization Structure by Matrix Organization Structure Type</u>

strong matrix structure

General Concept:	<u>matrix organization structure type</u>
Definition:	<u>matrix organization structure where the project has a team leader in each functional department and the products are passed from one team to the next. Furthermore, the project has a project manager for project coordination. The project manager is not one of the team leaders, but the organization has an additional functional department, composed by all the project managers of the organization's projects and managed by a manager (the Manager of Project Managers).</u>
Necessity:	<u>strong matrix structure is included Matrix Organization Structure by Matrix Organization Structure Type</u>

fully projectized organization structure

Concept Type:	<u>project organization structure type</u>
Definition:	<u>where resources are allocated on a dedicated basis to a project, from where they are controlled</u>
Definition:	<u>Typically organizations who have a predisposition to use projects as their corporate business approach, or are otherwise heavily involved on project work, or to individuals who are familiar with project management tools and techniques and are comfortable with their use. [D03197]</u>
Definition:	<u>fully projectized organization structure is included Project Organization Structure by Project Organization Structure Type</u>

pilot project

Definition: [a trial project to test performance](#)
Example: [the pilot project will start operating in June](#)

pilot project has start date/time

Concept Type: [is-property-of fact type](#)
Necessity: [Each pilot project has exactly one start date/time](#)

pilot project has end date/time

Concept Type: [is-property-of fact type](#)
Necessity: [Each pilot project has exactly one end date/time](#)

prototype

Definition: [the first form that a new design takes](#)
Example: [the prototype has revealed areas where the design can be improved](#)

project

General Concept: [business object](#)
Definition: A [project](#) is a temporary endeavor undertaken to create a unique [product](#) or [service](#). Temporary means that the [project](#) has an end date. Unique means that the project's end result is different than the results of other functions of the organization.
It can also comprise an ambitious plan to define and constrain a future by limiting it to set goals and parameters. The planning, execution and monitoring of major [projects](#) sometimes involves setting up a special temporary [organization](#), consisting of a [project team](#).
Definition: a structure to complete a specific defined [deliverable](#) or set of [deliverables](#). A [project](#) has a specific begin date and end-date, specific objectives ([project objective](#)) and specific resources assigned to perform the work ([project resource](#)). A project manager has overall responsibility and authority over a project. When the objectives are met, the project is considered complete.
Source: [\[TM 'project'\]](#)

project environment

Definition: The combined internal and external forces, both individual and collective which assist or restrict the attainment of the [project objectives](#). These could be business or [project](#) related or may be due to political, economic, technological or regulatory conditions.

project life cycle

[project life cycle \(PLC\)](#) is the name given to the steady progression of a [project](#) from its beginning to its completion

Synonym: [project life span \(PLS\)](#)
Synonym: [PLC](#)
Synonym: [PLS](#)
Necessity: the [PLS](#) is divided into phases. A typical [project life span](#) consists of two broad periods each of two major phases (i.e. four in all). The first period involves conceptualizing and validating with a business case [then planning and developing a project brief or charter].

The second period involves implementation, i.e. detailed design and construction of the product [followed by product transfer to the intended customer]
These phases are known by different names in different project environments.

PLC

Synonym

[project life cycle](#)

project life span

See:

[project life cycle](#)

PLS

See:

[PLC](#)

PLS phase

Concept Type

Definition:

Description:

Necessity

[role](#)

[PLS phases](#) are the four sequential major time periods through which any [project](#) passes

the [PLS](#) is divided into phases. A typical [project life span](#) consists of two broad periods each of two major phases (i.e. four in all). The first period involves conceptualizing and validating with a business case [then planning and developing a project brief or charter].

The second period involves implementation, i.e. detailed design and construction of the product [followed by product transfer to the intended customer]

These [PLS phases](#) are known by different names in different [project](#) environments.

each [PLS phase](#) *is included in some* [PLS](#)

PLS Phase1

Concept Type

General Concept:

Description:

[role](#)

[PLS phase](#)

This phase is named Concept or Conception (or Idea or Proposal or Inception). In this phase the [project](#) concept as a need solution is selected and defined. Is conceived an idea

PLS Phase2

Concept Type

General Concept:

Description:

[role](#)

[PLS phase](#)

This phase is named Development or Definition (or Elaboration or Feasibility or Gestation). In this phase the concept is verified and developed into a workable plan for implementation. Is developed the idea into a practical plan

PLS Phase3

Concept Type

General Concept:

Description:

[role](#)

[PLS phase](#)

This phase is named Execution or Implementation (or Operation or Construction). In this phase the project implementation plan (A formal document for the implementation and commissioning, startup & completion phases of the project. It describes the

complete course of action contemplated, including assumptions, organization, [stakeholder](#) communication, milestone schedule, quality and safety provisions, critical success indicators, etc.) is carried out. This is the phase of production work, coordination, cooperation, testing.

PLS Phase4

Concept Type: [role](#)
General Concept: [PLS phase](#)
Description: This phase is named Closeout or Closure or Finishing (or Maturation or Commission and transfer or Handover or Termination). In this phase the [project](#) is finished. This is the phase of transfer of product and information, review, closure.

PLS includes PLS Phase1

Concept Type: [partitive fact type](#)
Description: [PLS](#) is a composition of smaller entities ([PLS phases](#))
Synonymous Form: [PLS Phase1 is included in PLS](#)

PLS includes PLS Phase2

Concept Type: [partitive fact type](#)
Synonymous Form: [PLS Phase2 is included in PLS](#)

PLS includes PLS Phase3

Concept Type: [partitive fact type](#)
Synonymous Form: [PLS Phase3 is included in PLS](#)

PLS includes PLS Phase4

Concept Type: [partitive fact type](#)
Synonymous Form: [PLS Phase4 is included in PLS](#)

PLS Phase1 precedes PLS Phase2

PLS Phase2 precedes PLS Phase3

PLS Phase3 precedes PLS Phase4

PLS begins with PLS Phase1

Synonymous Form: [PLS starts with PLS Phase1](#)

PLS ends with PLS Phase4

Synonymous Form: [PLS finishes with PLS Phase4](#)

project state

Concept Type: [characteristic type](#)
Definition: [characteristic](#) of the [concept](#) [project](#) that *classifies* a [project](#) based on [his status](#).

project being finished

Concept Type: [project state](#)
Definition: [project](#) **that** *had terminated its* [PLS Phase4](#)

project being not finished

Concept Type: [project state](#)
Definition: [project](#) **that** *had not terminated its* [PLS Phase4](#)

project cost

Concept Type: [role](#)
Definition: Cumulative cost of a [project](#) over its whole life cycle.
Definition: The actual costs of the entire [project](#).
Description: [project costs](#) can be divided into [internal project cost](#) and [external project cost](#).

external project cost

Concept Type: [role](#)
General Concept: [project cost](#)
Description: [external project costs](#) can be controlled by [contracts](#) and budgets for each phase of a [project](#) and for each [deliverable](#) or work product.

project cost includes external project cost

Concept Type: [partitive fact type](#)
Synonymous Form: [project cost](#) *contains* [external project cost](#)
Synonymous Form: [external project cost](#) *is included in* [project cost](#)

project cost includes internal project cost

Concept Type: [partitive fact type](#)
Synonymous Form: [project cost](#) *contains* [external project cost](#)
Synonymous Form: [internal project cost](#) *is included in* [project cost](#)

internal project cost

Concept Type: [role](#)
General Concept: [project cost](#)
Definition: [internal project cost](#) is the cost of [project resources](#)

project has project cost

Concept Type: [is-property-of fact type](#)

project risk

Definition: external circumstances or events that must not occur for the [project](#) to be successful. (Contrast with the definition of an assumption)

project has project risk

Concept Type: [is-property-of fact type](#)
General Concept: It is possible that [project](#) *has* *at least* 1 and *at most* n [project risks](#)

project assumption

Definition:	external circumstances or events that must occur for the project to be successful. (contrast with the definition of a risk).
Note:	If an event is within the control of the project team , such as having testing complete by a certain date, it is not an assumption. It is part of the approach. If an event has a 100% chance of occurring, it not an assumption, since there is not 'likelihood' or risk involved. It is just a fact.
Example:	'budgets and resources will be available when needed ...'
Example:	'the new software release will be available for use by the time the Construct Phase begins'.

project has project assumption

Concept Type:	is-property-of fact type
Possibility:	It is possible that project has at least 1 and at most n project assumptions

project location

Definition:	the location on which, or at which, the work of the project takes place
Source:	[RMW 'Project Location']

project has project location

Concept Type:	is-property-of fact type
Note	the location of a project is the location and ground occupied, or to be occupied, by the project , on which, or at which, the work of the project takes place.
Possibility:	It is possible that project has at least 1 and at most n project locations

project has start date/time

Concept Type:	is-property-of fact type
Necessity:	Each project has exactly one start date/time

project has end date/time

Concept Type:	is-property-of fact type
Necessity:	Each project has exactly one end date/time

project has project phase

Concept Type:	is-property-of fact type
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project resource

Concept Type:	role
General Concept:	resource
Definition:	The project personnel , equipment, materials, and services needed to complete tasks in a project

project reserves project resource

project objective

General Concept:	<u>objective</u>
Definition:	A concrete statement describing what the <u>project</u> is trying to achieve. The <u>project objective</u> should be written at a low level, so that it can be evaluated at the conclusion of a <u>project</u> to see whether it was achieved or not. A well-worded <u>project objective</u> will be Specific (restricted to a particular individual, situation, relation, or effect. Free from ambiguity), Measurable (anything wherein the amount can be quantified), Attainable/Achievable , Realistic and Timebound
Definition:	a <u>specific</u> statement of <u>quality</u> , quantity and <u>time values</u> of a <u>project</u>
Definition:	Ia predetermined <u>result</u> , toward which <u>effort</u> is directed.
Definition:	The quantifiable <u>criteria</u> that must be met for the <u>project</u> to be considered successful. <u>project objectives</u> must included, at least, cost, schedule, and quality <u>measures</u> .
Reference Scheme:	a <u>proposition</u> that <i>corresponds to the</i> <u>project objective</u>

project has project objective

Concept Type:	<u>is-property-of fact type</u>
Necessity:	<u>project</u> <i>has almost one</i> <u>project objective</u>

team

Definition:	a <u>team</u> comprises any group of <u>people</u> linked in a common purpose. A group in itself does not necessarily constitute a <u>team</u> . Members of a <u>team</u> usually belong to different groups, but are assigned to activities for the same <u>project</u> , thereby allowing them to be viewed as one <u>team</u> . The <u>team</u> feature facilitates the creation, tracking and assignment of a group of people based on the <u>project</u> they have been assigned to. A <u>team</u> can be divided into sub-teams according to need. Members of a <u>team</u> usually belong to different groups, but receive assignment to activities for the same <u>project</u> , thereby allowing outsiders to view them as a single unit.
Reference Scheme:	the <u>names</u> <i>of the</i> members <i>of the</i> <u>team</u>

project team

General Concept:	<u>team</u>
Definition:	A <u>project team</u> is a <u>team</u> used for grouping people based on a common function. When a team is only used for a defined period of time it is often called a <u>project team</u> .
Definition:	The <u>project team</u> consists of the full-time and part-time resources assigned to work on the deliverables of the <u>project</u> . They are responsible for understanding the work to be completed, planning out the assigned activities in more detail if needed, completing assigned work within the budget, timeline and quality expectations, informing the project manager of issues, scope changes, risk and quality concerns, proactively communicating status and managing expectations The <u>project team</u> can consist of human resources within one functional organization or it can consist of members from many different functional organizations. A cross-functional team has members from multiple organizations. Having a cross-functional team is usually a sign of your organization utilizing matrix management.

Possibility: it is possible that a project team contains exactly one project personnel
Reference Scheme: the names of the members of the project team

project has project team

Concept Type: is-property-of fact type
Necessity: Each project has almost one project team

project personnel

General Concept: personnel
Definition: Those members of a project team employed directly by the organization responsible for a project.
Reference Scheme: the names of the members of the project personnel
Necessity: Each project personnel is included in almost one project team

project management

Definition: is the discipline of defining and achieving targets while optimizing the use of resources (time, money, people, space, etc). Thus, it could be classified into several models: time, cost, scope, and intangibles.
Definition: The planning, monitoring and control of all aspects of a project and the motivation of all those involved in it to achieve the project objectives on time and to specified cost, quality and performance.
Definition: The process of directing and coordinating human and material resources throughout the project life cycle using modern management techniques to achieve established objectives of scope, quality, time, cost and stakeholder satisfaction.
Definition: The planning, scheduling, and controlling of project activities to achieve performance, cost, and time objectives, for a given scope of work, while using resources efficiently and effectively.

project plan

Definition: a project management summary document that gives the essentials of a project in terms of its objectives, justification, and how the objectives are to be achieved. It should describe how all the major activities under each project management function are to be accomplished, including that of overall project control. The project plan will evolve through successive stages of the project life cycle.
Source: [PMK87 'Project Plan']
Synonym: project charter.

project charter

See: project plan

project management team

Definition: The members of the project team who are directly involved in project management activities. On some smaller projects, the project management team may include virtually all of the project team members.

Definition: Members of the [project team](#) who are directly involved in its management.

Reference Scheme: the [names of the](#) members of the [project management team](#)

project has project management team

Concept Type: [is-property-of fact type](#)

project management is responsibility of project manager

project manager

Concept Type: [role](#)

General Concept: [business entity](#)

Definition: is the [person](#) who has the overall responsibility for the successful planning and execution of any [project](#)

Definition: The person with authority to manage a [project](#). This includes leading the planning and the development of all project [deliverables](#). The [project manager](#) is responsible for managing the budget and workplan and all Project Management Procedures (scope management, issues management, risk management, etc.).

Definition: The person who heads up the [project team](#) and is assigned the authority and responsibility for conducting the [project](#) and meeting [project objectives](#) through project management

Definition: Person responsible to the [client of project](#) for the project work.

Definition: The individual appointed with responsibility for [project](#) management of the [project](#).

Definition: The person assigned responsibility and accountability for the [project](#) and is given the necessary authority to undertake that responsibility. The [project manager](#) reports to the [project sponsor](#).

Definition: The [project manager](#) is the individual responsible for the day-to-day management of the [project](#).

Definition: A non-technical role to take day-to-day responsibility for management of the [project](#) throughout all its phases.

Definition: An individual who has been assigned responsibility for accomplishing a specific unit of work. The [project manager](#) is typically responsible for the planning, implementing, controlling, and reporting of status on a [project](#).
Editor's Note: In this definition the [project manager](#) is responsible for "a unit of work", not necessarily the whole project. This is often the case in the real world of complex projects where "units of work" are assigned to different companies or [organizations](#) and consequently there is a proliferation of project managers on the project.

Definition: The role with total business responsibility for an entire [project](#); the individual who directs, controls, administers, and regulates a [project](#) acquiring software, a hardware/software system, or services. The [project manager](#) is the individual ultimately responsible to the end user.

Synonym [project leader](#)

Synonym [coordinator](#)

Synonym [facilitator](#)

Synonym [administrator](#)

Reference Scheme: the name and the contact details of the project manager that *manages* a project

project leader

See: project manager

coordinator

See: project manager

facilitator

See: project manager

administrator

See: project manager

project manager *is responsible for* project

Concept Type: associative fact type

Necessity: each project *has* almost one project manager

client of project

Definition: The party to a contract who commissions the work and pays for it on completion.

Definition: The person or organization for whom a project is implemented.

Reference Scheme: the name and the contact details of the client of project

project *has* client of project

Concept Type: is-property-of fact type

Necessity: each project *has* at least one client of project

executive sponsor

General Concept: business entity

Definition: The person who has ultimate authority over the project. The executive sponsor provides project funding, resolves issues and scope changes, approves major deliverables and provides high-level direction. He or she also champions the project within their organization. Depending on the project, and the organizational level of the executive sponsor, he or she may delegate day-to-day tactical management to a project sponsor.

Reference Scheme: the name and the contact details of the executive sponsor

project sponsor

General Concept: business entity

Definition: If assigned, the project sponsor represents the executive sponsor on a day-to-day basis, and makes most of the decisions requiring sponsor approval. If the decision is large enough, the project sponsor will take it to the executive sponsor.

Possibility: it is possible that a project *has* a project sponsor

Reference Scheme: the name and the contact details of the project sponsor

project *has* executive sponsor

Concept Type: is-property-of fact type

Necessity: Each project *has* exactly one executive sponsor

deliverable

Concept Type: role
Definition: a deliverable is any tangible outcome that is produced by the project. These can be documents, plans, computer systems, buildings, aircraft, etc.
Necessity: Each collaboration activity *is composed of* internal deliverable and external deliverable

project produces deliverable

Necessity: each project *produces* some deliverable

deliverable type

Concept Type: categorization type
Definition: concept that specializes the concept 'deliverable' and that classifies a partner based on whether it is an internal deliverable or an external deliverable.

Deliverable by Deliverable Type

Definition: segmentation that is for the concept 'deliverable' and subdivides deliverables using deliverable type
Necessity: Deliverable by Deliverable Type contains the categories 'internal deliverable' and 'external deliverable'.

internal deliverable

Concept Type: deliverable type
Definition: internal deliverables are produced as a consequence of executing the project, and are usually only needed by the project team.
Necessity: internal deliverable is included in Deliverable by Deliverable Type

external deliverable

Concept Type: deliverable type
Definition: external deliverables are those that are created for clients and stakeholders.
Necessity: external deliverable is included in Deliverable by Deliverable Type

project critical success factor

Concept Type: role
Definition: A project critical success factor is any event that must occur for the project to meet its goals and objectives.

project has project critical success factor

Concept Type: is-property-of fact type
Possibility: It is possible that a project *has* some project critical success factor.

project issue

Definition: project issue is a major problem that will impede the progress of the project and cannot be resolved by the project manager and project team without outside help

Possibility: It is possible that a project *has* some project issues

program

Definition: a program is the umbrella structure established to manage a series of related projects. The program does not produce any project deliverables. The project teams produce them all. The purpose of the program is to provide overall direction and guidance, make sure the related projects are communicating effectively, provide a central point of contact and focus for the client and the project teams and determine how individual projects should be defined to ensure all the work gets completed successfully.

Reference Scheme: a proposition that *corresponds to* the program

program manager

Concept Type: role

Definition: the person with authority to manage a program. The program manager leads the overall planning and management of the program. All project managers within the program report to the program manager.

Example: the program manager may also be responsible for one or more of the projects within the program. They would be project manager on those projects as well as overall program manager.

Reference Scheme: the *name of* the program manager that *manages* a program

program *has* program manager

Concept Type: is-property-of fact type

Necessity: each program *has* exactly one program manager

project *has* expression

Concept Type: is-property-of fact type

expression is used to describe a specific project

5) Financial: budgets, balance sheet, profits

capital

Definition: the financial investment required to initiate and/or operate an enterprise

profit margin

Definition: total revenues less total expenses

liquidity

Definition: the percentage of an enterprise's assets that can be quickly converted into cash.

ROI

Definition: (Return on Investment) Net Profit divided by Net Worth. A financial ratio indicating the degree of profitability.

6) Capacity: facilities, equipment

resource includes human resource

Concept Type partitive fact type

human resource

Definition:

Note human resource is a category (special kind or subtype) of the more general concept of resource

resource includes economic resource

Concept Type partitive fact type

economic resource

Definition:

Note economic resource is a category (special kind or subtype) of the more general concept of resource

resource includes knowledge resource

Concept Type partitive fact type

knowledge resource

Definition:

Note knowledge resource is a category (special kind or subtype) of the more general concept of resource

IT infrastructure

General Concept: business object

Definition: It represents the available telecommunication infrastructure.

Example: Fax, phone, e-mail, etc.

IT infrastructure has e-mail

Concept Type is-property-of fact type

Possibility: It is possible that an address *owns* at least one a e-mail

IT infrastructure has fax

Concept Type is-property-of fact type

Possibility: It is possible that an address *owns* at least one fax

IT infrastructure has phone

Concept Type [is-property-of fact type](#)
Necessity: Each [address](#) *has* at least one [phone](#)

IT infrastructure *has* website

Concept Type [is-property-of fact type](#)
Possibility it is possible that the [IT infrastructure](#) *owns* at least one [website](#)

7) Personnel: skills, locations, responsibility,...

staff

Definition: the employees of an [organization](#)
Example the new manager will be joining the [staff](#) in November
Synonym [personnel](#)

personnel

Synonym [staff](#)

subordinate

Definition: a person who works under a more senior member of [staff](#)

white-collar

Definition: employees who work in offices

training

Definition: (professional) formation

skill

Definition: an ability and competence learned by practice

competence

Definition: Ability to perform up to a required [standard](#).
Source: [RMW 'Competence']

8) Business Rules: policies, regulations, ...

business rule *has* expression

Concept Type [is-property-of fact type](#)
Necessity: Each [rule](#) *has* at most one [language \(structured English\)](#).
Description: [expression is used to describe a specific business rule](#)

business rule *realizes* business policy

Synonymous Form: [business policy is realized by business rule](#)

business rule *supports* business process

Synonymous Form [business process is supported by business rule](#)

business rule *constrains* business process

Generic Business English Vocabulary

Guidance

<Generic Business English Vocabulary Rules>

Vocabulary: Generic Business English Vocabulary

<Generic Business English Vocabulary Levels of Enforcement>

Enforcement Level: strict

Definition: strictly enforced: if the rule is violated, the sanction or other consequences always ensue.

Enforcement Level: deferred

Definition: deferred enforcement: strictly enforced, but enforcement may be delayed — e.g., waiting for resource with required skills.

Enforcement Level: pre-authorized

Definition: pre-authorized override: enforced, but exceptions allowed, with prior approval for actors with before-the-fact override authorization.

Enforcement Level: post-justified

Definition: post-justified override: if not approved after the fact, the sanction or other consequences will ensue.

Enforcement Level: override

Definition: override with explanation: comment must be provided when the violation occurs.

Enforcement Level: guideline

Definition: guideline: suggested, but not enforced.

Rule set- Company Summary

It is necessary that each organization has exactly one name

Guidance Type: structural business rule

Description: A name, only one name, must always be specified

Supporting fact type	<u>organization has name</u>
----------------------	------------------------------

It is necessary that each organization has exactly one reg country

Guidance Type: structural business rule

Description: reg country is used to identify the centre seat of an organization. A reg country, only one, must always be specified

Supporting fact type	<u>organization has reg country</u>
----------------------	-------------------------------------

It is necessary that each organization has exactly one tax identifier

Guidance Type: structural business rule

Description: tax identifier is used to identify an organization. A tax identifier, only one, must always be specified

Supporting fact type	<u>organization has tax identifier</u>
----------------------	--

It is necessary that each organization has exactly one orgconfiguration

Guidance Type: structural business rule

Supporting fact type	<u>organization has orgconfiguration</u>
----------------------	--

It is necessary that each branch is included in exactly one local area.

1. structural business rule

Supporting fact type	<u>branch is included in local area</u>
----------------------	---

It is necessary that each local area is included in exactly one operating company

Guidance Type: structural business rule

Supporting fact type	<u>local area is included in operating company</u>
----------------------	--

It is necessary that each organization site is located in exactly one operating country.

Guidance Type: structural business rule

Supporting fact type	<u>operating company operates in operating country</u>
----------------------	--

Rule set- Markets

It is necessary that each business process *has* at most one business process type

Guidance Type: structural business rule

Description: business process type is used to identify a business process

Supporting fact type	<u>business process</u> <i>has</i> <u>business process type</u>
----------------------	---

It is necessary that each business process *has* at most one name

Guidance Type: structural business rule

Supporting fact type	<u>business process</u> <i>has</i> <u>name</u>
----------------------	--

It is necessary that each business domain *has* at most one name

Guidance Type: structural business rule

Supporting fact type	<u>business domain</u> <i>has</i> <u>name</u>
----------------------	---

It is necessary that each business area *is included in* exactly one business domain.

Guidance Type: structural business rule

Synonymous Form: *It is necessary that each* business area *is owned by* exactly one business domain

Supporting fact type	<u>business area</u> <i>is included in</i> <u>business domain</u>
----------------------	---

It is necessary that each business area *has* at least one scope

Guidance Type: structural business rule

Supporting fact type	<u>business area</u> <i>has</i> <u>scope</u>
----------------------	--

It is necessary that each process area *is included in* exactly one business area.

Guidance Type: structural business rule

Supporting fact type	<u>process area</u> <i>is included in</i> <u>business area</u>
----------------------	--

It is necessary that each partner *has* at most one name

Guidance Type: structural business rule

Supporting fact type	<u>partner</u> <i>has</i> <u>name</u>
----------------------	---------------------------------------

It is necessary that each partner *has* at most one contact details

Guidance Type: structural business rule

Supporting fact type	<u>partner</u> <i>has</i> <u>contact details</u>
----------------------	--

It is necessary that each deliverer *has* at most one name

Guidance Type: structural business rule

Supporting fact type	<u>deliverer</u> <i>has</i> <u>name</u>
----------------------	---

It is necessary that each deliverer *has* at most one contact details

Guidance Type: structural business rule

Supporting fact type	<u>deliverer</u> <i>has</i> <u>contact details</u>
----------------------	--

It is necessary that each competitor *has* at most one name

Guidance Type: structural business rule

Supporting fact type	<u>competitor</u> <i>has</i> <u>name</u>
----------------------	--

It is necessary that each competitor *has* at most one contact details

Guidance Type: structural business rule

Supporting fact type	<u>competitor</u> <i>has</i> <u>contact details</u>
----------------------	---

It is necessary that each agreement *has* at most one agreement type

Guidance Type: structural business rule

Supporting fact type	<u>competitor</u> <i>has</i> <u>contact details</u>
----------------------	---

It is necessary that each agreement *has* at least two partners

Guidance Type: structural business rule

Supporting fact type	<u>partner</u> <i>participates</i> <u>agreement</u>
----------------------	---

It is necessary that each contract *is manifested in* exactly one contract-document

Guidance Type: structural business rule

Supporting fact type	<u>contract</u> <i>is manifested in</i> <u>contract-document</u>
----------------------	--

It is necessary that each supplier *has* at most one name

Guidance Type: structural business rule

Supporting fact type	<u>supplier</u> <i>has</i> <u>name</u>
----------------------	--

It is necessary that each supplier *has* at most one contact details

Guidance Type: structural business rule

Supporting fact type	<u>supplier</u> <i>has</i> <u>contact details</u>
----------------------	---

It is necessary that each supply contract *sets* some deliveries

Guidance Type: structural business rule

Supporting fact type	<u>supply contract</u> <i>establishes</i> <u>delivery</u>
----------------------	---

It is necessary that each supply contract *has* exactly one remuneration

Guidance Type: structural business rule

Supporting fact type	<u>supply contract</u> <i>establishes</i> <u>remuneration</u>
----------------------	---

It is necessary that each delivery *has* some quantities

Guidance Type: structural business rule

Supporting fact type	<u>delivery</u> <i>has</i> <u>quantity</u>
----------------------	--

21 The security in an Information System.

The term “security”, in a ICT context, is referred to the capability to protect the confidentiality, the entirety and the availability of the information. In this project it will be designed a mechanism granting security and privacy of sensible information in the BML framework. Privacy of information will be addressed through a mechanism that could allow each enterprise to define policy and rules of data management for each service published in the DBE environment, in order to grant the right level of trusted interchange of information.

Increasing the level of the detail, the “security” handles the following aspects:

1. to safeguard the confidentiality of the information means to reduce to acceptable levels the risk that an entity can, voluntarily or involuntarily, to approach the same information without some is authorized;
2. to safeguard integrity of the information means reduce to acceptable levels the risk that cancellations or modifications of information could happen, as a result of participations by not authorized entities or of not controllable phenomena;
3. to safeguard the availability of the information means reduce to acceptable levels the risk of the event "deny of service"

But in this case our attention is focused only on the first point: confidentiality of the information. If the access to a part of the company's Information System is authorized to own customer, partners, suppliers, collaborators then some vulnerability can be created.

The flow of the digital information, moved within the company and between different companies, represents a fundamental strategic asset. It must be protected against the attempts of intrusion. But a deliberate attempt of intrusion is not the only way in which an information can be accessed by a not authorized person. There are different types of information accessible to different groups of users of the Information System. So, the management of the access to the information requires to identify the user, his role and his authorizations.

The focus of this paragraph is on the management of the authorizations. The security in the data-transfer is already managed by many protocols in different layers of the network, so this aspect is outside our interests. In this section will be studied the Identity Access Management, its characteristics, the main architectural components and the technological standards, focusing our attention on Access Control System and access control policies.

In the last part of this section will be provided/suggested an architectural solution based on different levels of authorization depending by the different possible roles of the actor in the system.

The enterprises that decide to transfer online a part of the own data, applications and transactions must make it with the knowledge that this involves a total redefinition of the existing infrastructure.

In the last years many firms have focused their attention on the conversion of their Information System in a web-based architecture and on the development of new web-applications which allow the firm to share with clients, suppliers and partners a part of their processes.

a. The Service oriented policy.

To realize an integration between different and not-homogeneous managerial tools is necessary to resort to the services. The problem of the “*security identity management*”, with an explicit reference to an indivisible bond with functionalities of security, is very complex. The increasing number of identities requires a greatest effort to manage the repository of the firms. In the last years, and in the DBE context too, the firms extend their limits, sharing many data with customer, partners and suppliers. The information about the identity of the user are, often, fragmented and allocated on different systems. A possible solution is an Identity & Access Management which can support the scalability needed for the next expansion.

b. The Identity Access Management

In this paragraph will be described the main elements which compose the I&AM (Identity and Access Management). The following figure show a possible architecture:

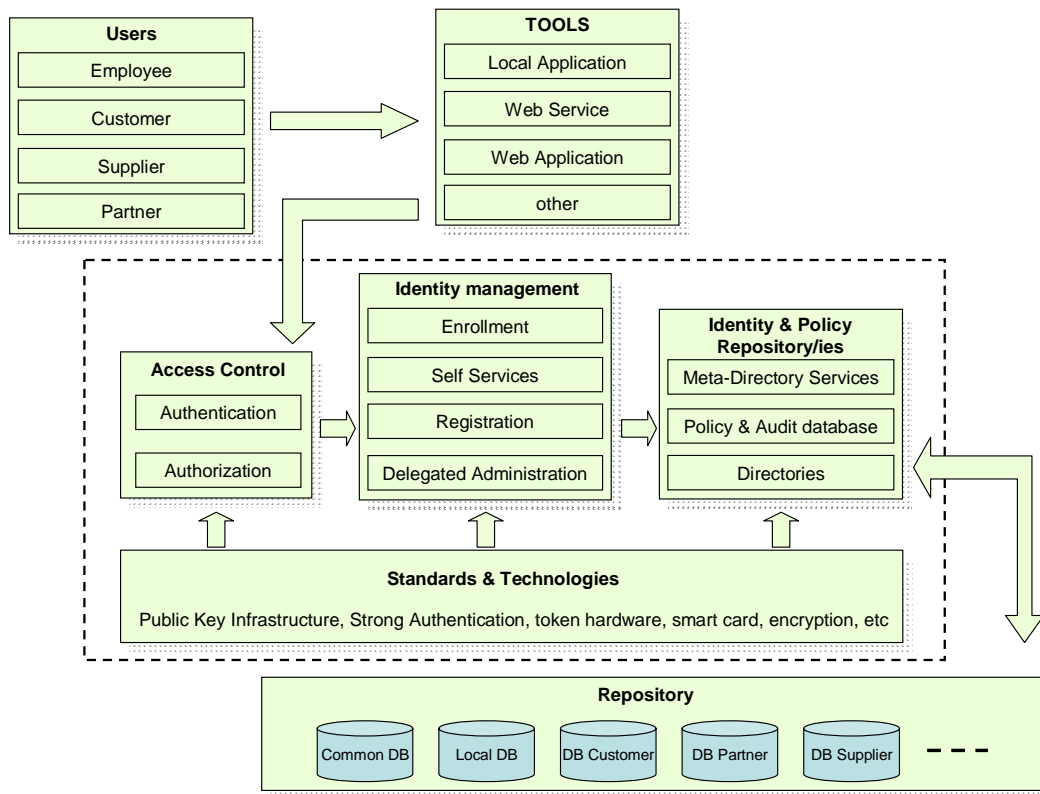


Figure 23: a possible structure for security management

This architecture is not based on hypothesis about the nature of the repository. It can be distributed, centralized, stand-alone DB Manager, etc. the architecture can be modified and adapted to the context. The elements:

Access Control

Is composed by two elements:

- Authentication which includes the authentication and identification services (local or by web);
- Authorization which provides to each user its own access rights in the specific system in which the user is logged-on.

Identity management

A system for the management of the users and their profiles.

Identity & Policy Repository:

repository and management system for users, access policies and passwords.

21.2.1 Access Control Module

The Access Control Module, even named Privilege Management Infrastructure (PMI), guarantees that the user can access only the information, the application and the resource that He can use and read. This component, as just specified in the previous paragraph, is composed by two elements.

21.2.1.1 Authentication

The Authentication Manager implements the process of authentication of a user which sign onto an information system. The user is identified according to the credentials which he provides.

Many organizations consider this element as one of the starting points in the implementation of a full I&AM system. The verification of the correctness of a digital identity, or authentication, can be realized in many modalities, with different degrees of robustness. The most simple way of authentication is realized with the use of username and password related to the account of the user.

The authentication can be reinforced by some tools such as token, smart card or, in some cases, other information coming from user's biometric.

The cryptographic technics are other technological solution for the authentication process: Public Key Infrastructure (PKI) and Kerberos system.

For each system the right level of protection must be valued and then will be configured the appropriate level of authentication.

21.2.1.2 Authorization

The aim of the authorization is to provide to the application, independently by the type authentication realized, data about the user and his level of right. This element manages the rights of each user, decides if the user can or not access to some resources and provides data about the authorization to the application. In this process is used the concept of "qualifying profile" as a group of functions which the user can execute and objects which He can access.

With the aim to render the management of the authorizations more easy, the model RBAC (Role Based Access Control) [Ferraiolo and Kuhn,1992] is becoming popular in the authorization ambit.

According to this view, the authorization are assigned not directly to the user, but to a role which can be associated to one or more users. This *modus operandi* creates qualifying profiles for homogeneous groups of users.

Other tasks of the Authorization Manager are:

- to implement the correct control policy relative to expirations and to invalidate the authentication credentials;
- to apply methods in order to avoid hacking attempted of the authentication system, for example tried to repeated to execute login with one same user id with the scope "to discover" the password;
- to allow a correct auditing, so as to provide to the system's administrators the control on the accesses and the interactions with the system;
- to connect with an opportune User Repository in which all the users are stored with eventual additional information.

Furthermore the Authentication system can be implemented for support the Single Sign-On (SSO) in two different way. The first way is referred to a single point of access, for example in a web-based system (WEB-SSO), with the possibility to maintain the authentication, obtained on a system, also onto other system.

In the second way there is an Enterprise SSO, that is foreseen only on2 point of access also for not-WEB system. The SSO system has, integrated, a Password Management System, a module which unifies the passwords related to different sub-systems.

Furthermore different applications can require different types of authorizations:

- a web server pr an application server can control the access to their files or directories using the user's authorization profiles, guaranteeing system's and infrastructural safety to the supported applications.
- A web portal requires authorization for the various resources which it manages (for example portlet, web pages, etc) performing, often, the role of administrator and the role of client. Therefore it needs its own authorization schema, with its own rules and definitions.

- An enterprise application is mostly focused on authorizing the functionalities which it provides. In some cases it is necessary to authorize the access to the resources on which the user can operate.

21.2.1.3 Identity Manager

The Identity Manager administrates the User Repository in which are stored the groups of user, their authorization profiles, the association between users and groups, the rules. With the aim to integrate the access management functionalities provided by the Access Control module, the Identity Management can implements services for the total manage of the identities:

- Management of the organizations, user's profiles, groups;
- Substitute administration;
- Grant of authorization using rules and roles;
- Flexible workflow;

Main characteristics:

- Possibility to delegate and subdivide the responsibility of management the user. The subdivision can be made, for example, on a regional organization basis.
- Availability of a client-side application for authorization management;
- Scalability.

21.2.1.4 Identity & Policy Repository

The Identity and Policy Repository contains the information about user's account, the groups which belong to the safety domain and all the data necessary for the implementation of the rules for the access to the resources (applications, data, etc.).

In the Identity Repository are contained the user's credentials ore the information for their validation.

The stored data change according to the chosen authentication process: username and password, smart card, etc.

The User Repository can be realized with a LDAP directory, a database for the management of distributed information. It contains information about objects and the rules for access them.

The user or the application can interact with the LDAP directory specifying the name of the object to access and receiving information about that object.

For example using the Directory it is possible to define, in a system which uses the user profiles, a map between the userid and the registry information or email address or each other information about the user and his access rights.

The LDAP Directory is usually described through four different model:

- The informative model which describes the organization of the data;
- The functional model which describes the interaction between the elements of the Directory;
- The organizational model which describes the relations between the various entity and the information which they manage;
- The safety model which describes the feature about the authentication and authorization.

According to its feature, the Directory is appropriate for integration with the Authentication Manager, while in some cases can be not totally appropriate for the Authorization Manager.

In fact, while there are standard schemas for management of the user, the representation of information about authorization is very complicated, so it result more manageable to use relational schemas which provides a larger expressiveness.

21.2.2 General description

Starting from the previously described architecture, the I&AM System had to satisfying the following requirements:

1. having a centralized repository (or distributed but, in this case, there can be some incoherences in the data) for collecting the identity of all the users;
2. to provide a user-friendly interface for the administrator and the possibility to delegate the administrative role;
3. to provide a flexible system of interconnection with repository, not only of the organization but also and above all of the partner, suppliers, etc.
4. to include a provisioning subsystem which provides:
 - self service process for account request;
 - user profile;
 - certificates.
5. WEB SSO.

21.2.3 The phases of the Identity Management

Five phases can be distinguished for the identity management which allow user to access the right resources:

- Obtain the data about the identities: the Identity Management starts from the acquisition of user's information coming from many different sources such database, workflow processes and the user itself;
- Processing and validation of the data: in this phase the data are verified and validated. The aim is to validate the data and the authorization assigned to the users, so that they can be eligible for the pre-defined Policy;
- Data management: after the validation, is necessary to organize the data so it can be simple to manage and use them. The users are classified and grouped according to their right.
- Management of the users: after the validation and organization of the users' information the data are send to the various repository;
- Use of the data: in this last phase he data are used to generate reports for control of safety and activities.

21.2.4 Access Control Policy

Three categories of access policy can be distinguished:

- Discretionary Access Control, DAC;
- Mandatory Access Control, MAC;
- Role-based Access Control, RBAC.

With the Discretionary Access Control the access control is based on identity of the user which send the request and on a set of rules which specify who can or can't execute a specific operation on a resource. The user can transfer his right to another user (discrezionario).

The Mandatory Access Control manages the access control according to a set of rules defined and imposed by a central authority. The most popular form of this type of policy is named multi-level. It is based on the classification of subjects and objects in the system: the object is the passive element which contains the information, the subject is the active element which requires the information and so the access to the objects. In the Mandatory Access the user is not the subject, but the user is the person who access the system and the subject is the process (running program) which operates for the user.

The Role-based Access Control was introduced in the first period of '90, for the control in the commercial application. The main motivation behind this type of policy is the necessity to specify and to impose control rules of the access connected to the organizational structure.

This choice is justified, above all, by one aspect: the identity of the user is important only for his responsibilities; for the control of the access is not important to know the identity of the subject but is more important to know his role, his function in the organization or, for an external subject, the role and the relation which He has with the organization.

The RBAC's policy satisfies this requirement providing the rights to the roles and then assigning the rule to the users, according to their responsibility, role and relation with the organization.

The assignment of the right to the roles and of the role to the user in a dynamic procedure, it can be changed to satisfy the mutation of the requirement of the organization. So in the RBAC policy , compared to the policy of DAC and MAC, the choice to allow a specific right to a user is based not only on the identity of the user, but also on other characteristics of the user in relation with the organization. This approach allow a more flexible management of the access control policy.

Appendix A: BML 2.0 MOF metamodel

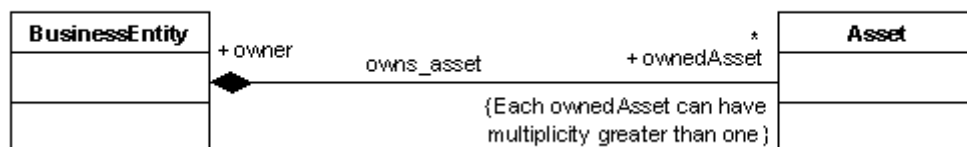
A.1 Introduction

In order to grant compatibility with the BML 1.0 framework we report a MOF-based version of the BML 2.0 metamodel and of the SSL 2.0 metamodel.

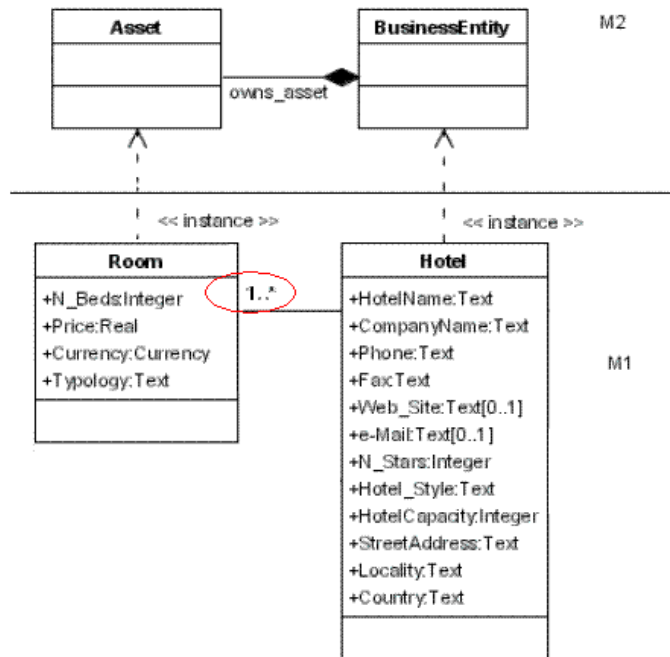
A.2 Changes

The version 2.0 of the BML metamodel encompasses some changes that are listed below.

- In order to provide the modeller with the possibility to specify multiplicity on the instances of the associations, some constraints have been introduced on the *owns_asset*, *provides* and *owns_subUnit* associations of the *BusinessOrganization* package. The following image shows an example of such constraint.



These means that, at the M1 level, it is possible to specify that a class Hotel::BusinessEntity owns “at least 1” and “at most n” Room:: Asset, as shown in the picture below.



- In the *Core* package, some additional classes (*Association*, *Source*, *Target* and *AssociationEnd*) and the related associations have been introduced in order to allow, at the M1 level, to define associations that are not encompassed in the metamodel.
- In the *BusinessProcess* package, the multiplicity on the *involves_participant* association between the classes *Commitment* and *Role* has been changed (from "1 to 1" to a "*" to *").
- In the *BusinessProcess* package, the *precedes* association related to the *Behaviour* class the multiplicity "*" to "*" and some *AssociationEnds*' name have been introduced.
- In the *BusinessEvent* package, the navigational direction has been removed from the relationships between the *Event* and the *Behaviour* classes and the related *AssociationEnds*' names have been changed.
- In the *BusinessProcess* package, the navigational direction have been removed from several associations (*is_used_in*, *produces*, *begins_when*, *ends_when*, *generates*, *needs_before*, *needs_after*, *needs_during*, *precedes*).

A.3 BML Metamodel

In this section we report the whole BML 2.0 MOF metamodel.

