

Preliminary Notice

This paper is freely downloadable (PDF) from www.conceptualheaven.com.

To appreciate its contents, you need to be aware of the purpose and the main principles of the "Semantics for Business Vocabulary and Rules" specification (SBVR) published by the Object Management Group (OMG) and freely downloadable (PDF) from www.omg.org/spec/SBVR/ at the time of writing. That information is available as part of that specification, notably in Clause 1 and Annex A.

This paper contains a simplified meta-model for modelling business knowledge on the basis of SBVR and for creating specifications in the "SBVR-style" document format. Its purpose is to make SBVR more accessible for practitioners with a practical goal and limited theoretical concerns.

The diagramming technique used in this paper is specified in a sibling document entitled "Conceptual Heaven Concept Diagrams". An example of a model is in a document entitled "Conceptual Heaven EU-Rent Example Model". Both related documents are freely downloadable from www.conceptualheaven.com.

More information about the purpose and content of this document and its relations to other materials can be found in the Introduction section and in Clause 1.

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Introduction to "Conceptual Heaven Vocabulary Documents"

To locate the materials discussed in the following paragraphs, please refer to "Related documents" at the end of this section.

What is "Conceptual Heaven Vocabulary Documents" ?

"Conceptual Heaven Vocabulary Documents" is a simplified version of the meta-model published by the Object Management Group (OMG) entitled "Semantics of Business Vocabulary and Rules" (SBVR). In addition, it provides a formalisation and user's guide for a document format for "SBVR-style documents", which OMG also uses to present SBVR itself. Rather than just offering a summary or simplified version, this paper also contains commentary, especially where it departs from SBVR.

Is this document for you ?

This document is for you if you are applying (or if you are interested in applying) SBVR for your own purposes and you are looking for a more accessible specification than SBVR itself.

Purpose

The purpose of this paper is to make SBVR more accessible to practitioners interested in modelling with SBVR who have a practical goal and limited theoretical concerns.

The intention of this paper is not to offer an alternative to SBVR, but rather to promote the practical use of SBVR. SBVR excels at logical and linguistic precision but its elaborate network of meta-concepts can be bewildering to practitioners who wish to benefit from SBVR's rigour and conceptual clarity. It is hoped that this meta-model will make it easier for writers to compose an SBVR-style document with confidence, focusing on the business subject at hand rather than on theoretical considerations of methodology, language and logic. An advantage of the formalized document format is that document content can be made machine-processable.

Relation to SBVR

This paper does not use the entire SBVR meta-model. It adopts a subset of concepts on a per-concept basis. Whether a concept has been adopted from SBVR or not has been stated in each case. To a limited degree, SBVR concepts and other elements of meaning have been redefined, in which cases a short commentary is often included. In almost all those cases, the purpose of redefinition was not to alter the meaning of SBVR, but to get a better fit for the concepts in the smaller framework.

Simplifying a meta-model such as SBVR raises the important question how much meaning is lost or even distorted in the process. This document goes some way to answering this question. Its definitions make explicit how the adoption of terms includes, or affects, their meaning.

The conceptual framework of section 4 is much simplified. 'Instance' and other concepts related to extension are informally assumed in some of the running text but not formally addressed. 'Role' is limited to 'verb concept

role' [SBVR 1.1] and the (complex) relationship it establishes between actualities and nominal intension is glossed over. The same applies to the SBVR conceptual framework for understanding designation and representation, possibly slightly overlaboured for most purposes in [SBVR 1.1 (8.3)].

Section 3 introduces a different definition of 'term' from SBVR. This definition is more practical in the perspective of the [CH-SBVR] vocabulary, which is very much the perspective of a lexicographer of business terminology.

Section 5 introduces a different definition of 'definition' from SBVR. This definition makes it easier to see the kinship between structural rule statements on the one hand and, on the other, many of the formal or part-formal definition texts met in business practice.

Throughout this specification, the concept of 'vocabulary' is put forward as the primary instrument to disambiguate terms with the same name but a different meaning. SBVR has a more elaborate meta-model where 'subject field' is another level at which terms may be disambiguated; it is not entirely clear whether 'vocabulary' [SBVR 1.1 (11.1)] is intended to be used for disambiguating between terms in the same language, or whether it is mostly, or completely, intended as a means to account for terms with the same meaning in different languages.

Relation to SBVR document format recommendations

SBVR 1.1 includes informative, as opposed to normative, sections on both "SBVR-style documents" and the English language constructs suitable to be used in them ("SBVR Structured English"). These sections are mostly in Annexes C-D-E of the SBVR 1.1 specification.

The document format presented here is a proposed improvement and formalization of these informative sections. It includes many design choices that diverge from the recommendations in the SBVR Annexes.

Relation to SBVR diagramming technique

Diagramming on the whole is not part of the SBVR formal specification. SBVR 1.1 includes informative sections on a variety of diagramming conventions (Clause 13, Annexes G-H, Annex E). In addition, the presentation of SBVR itself uses diagramming throughout as a reading aid. These various pieces of information lack consistency and rely unnecessarily on knowledge of UML.

This paper uses diagramming in much the same way as the normative sections of SBVR. A meta-model of the diagramming technique is in the "Conceptual Heaven Concept Diagrams" paper downloadable from www.conceptualheaven.com.

Examples

For an example of the document format specified here, open the "Conceptual Heaven EU-Rent Example" published at www.conceptualheaven.com. It demonstrates typical design patterns encountered when applying the modelling technique and document format. It also demonstrates the diagramming technique.

The SBVR formal specification itself is another example of the document format. The same is true of the document you are now reading.

Version information

Conceptual Heaven 1.0

Version 1.0 of the "Conceptual Heaven Concept Diagrams" schema and version 1.0 of the "Conceptual Heaven EU-Rent Example Model" schema are compatible with this 1.0 paper.

SBVR 1.0 and 1.1

Version 1.0 of the Conceptual Heaven schemas is for version 1.1 of the SBVR specification as published by OMG. A final version of SBVR 1.1 became available to the general public in May 2013. This version is labeled "SBVR 1.1 Beta 2". An official non-Beta document is expected to be published in July 2013, but this version is not expected to contain any changes at the content level. SBVR 1.1 does not include major modifications relative to 1.0, although some key terminology was revised. Of particular importance to the Conceptual Heaven models is the 1.1 decision to use 'verb concept' as the primary term for what was usually called 'fact type' in SBVR 1.0 (where 'verb concept' was just a less-often-used synonym of 'fact type'), reserving 'fact type' as a more technical term for the area of logical formalization covered by Clause 10. This decision has an effect on neighboring terms with "verb". For example, 1.1 introduces "verb concept role" to clearly distinguish roles that are not situational roles.

Conceptual Heaven endorses these key terminology changes in its 1.0 schemas.

Related documents

1. "Semantics of Business Vocabulary and Rules" (SBVR), v. 1.0, formal OMG specification, freely downloadable from <http://www.omg.org/spec/SBVR/1.0/>.
2. "Semantics of Business Vocabulary and Rules" (SBVR), v. 1.1 Beta 2, OMG specification, freely downloadable from <http://www.omg.org/spec/SBVR/1.1/>.
3. "Conceptual Heaven Concept Diagrams v. 1.0", freely downloadable from www.conceptualheaven.com.
4. "Conceptual Heaven EU-Rent Example Model v. 1.0", freely downloadable from www.conceptualheaven.com.

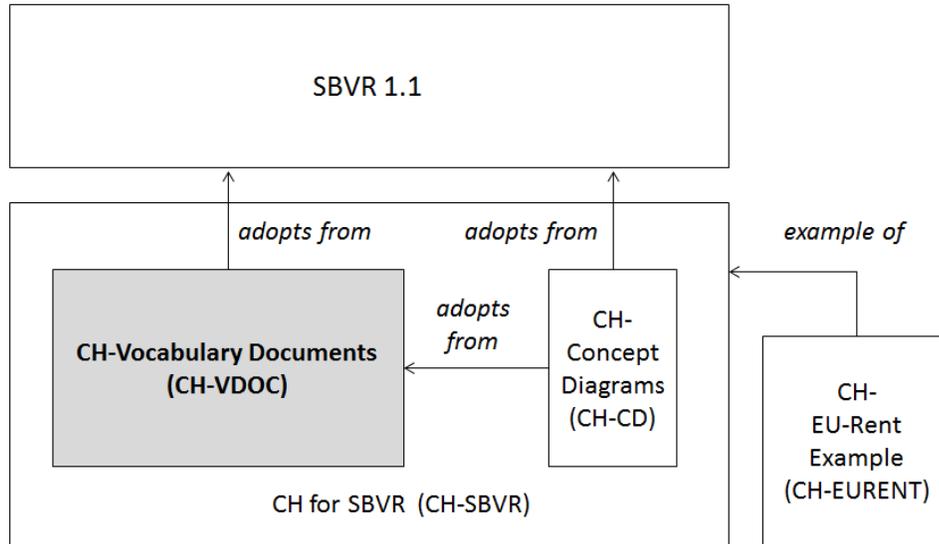
More Conceptual Heaven

If you use MS Word 2010 to draw up glossaries and rulebooks in the presentation format used in this document, Conceptual Heaven proposes freely downloadable tools that allow you to convert such specifications into:

- Alphabetical lists of terms and definitions in tabular presentation.
- Validation reports that give information about integrity of your glossaries and rulebooks.
- XML documents that allow you to exchange the information with tools, services and databases.

A Word template that gives you a jump-start in this area is also offered for free. In addition to click-and-use these tools, you can also join Conceptual Heaven's online community by simple and free registration. This allows you to download the XSLT Framework that the tools are based on so you can customize for yourself. Finally, you can also contribute actively by extending Conceptual Heaven's tool offerings.

1. Vocabulary registration



1.1. Subject vocabularies

Conceptual Heaven for SBVR 1.0

Definition: The combination of: [Conceptual Heaven Vocabulary Documents 1.0](#) and [Conceptual Heaven Concept Diagrams 1.0](#).

Synonym: [CH-SBVR 1.0](#)

Note: This vocabulary specifies the [terminology namespace](#) of this [vocabulary document's subject vocabulary](#).

Note: An example of the document format and diagram format specified by this vocabulary is offered in "Conceptual Heaven EU-Rent Example v. 1.0", freely downloadable from www.conceptualheaven.com.

Namespace URI: <http://www.conceptualheaven.com/spec/ch-sbvr10>

Conceptual Heaven Vocabulary Documents 1.0

Definition: Version 1.0 of the specification of an "SBVR-style" document format applied in vocabulary documents published by [Conceptual Heaven](#) and known as "Conceptual Heaven Vocabulary Documents".

Note: The [subject vocabulary described in](#) this [vocabulary document](#).

Note: This vocabulary is included in [Conceptual Heaven for SBVR 1.0](#).

Synonym: [CH-VDOC 1.0](#)

Namespace URI: <http://www.conceptualheaven.com/spec/ch-vdoc10>

1.2. Other vocabularies

Conceptual Heaven Concept Diagrams 1.0

Definition: Version 1.0 of the specification of a diagramming technique applied in vocabulary documents published by [Conceptual Heaven](#) and known as "Conceptual Heaven Concept Diagrams".

Note: This vocabulary is included in [Conceptual Heaven for SBVR 1.0](#).

Synonym: [CH-CD 1.0](#)

Longman Dictionary of Contemporary English

Definition: The publication ""Longman Dictionary of Contemporary English", © Longman Group Ltd 1978, Harlow, UK, Reprinted with corrections 1981, ISBN 0 582 52571 3.

Synonym: [LDCE](#)

Note: The vocabulary serving in this document as the common-language vocabulary.

Semantics of Business Vocabulary and Rules 1.1

Definition: Version 1.1 of the formal specification published by [OMG](#) known as the "Semantics for Business Vocabulary and Rules" (SBVR).

Synonym: [SBVR 1.1](#)

Namespace URI: <http://www.omg.org/spec/SBVR/20070901/SBVR.xml>

Semantics of Business Vocabulary and Rules 1.1, Annexes C-D-E

Definition: Non-normative annexes C, D and E accompanying version 1.1 of the formal specification published by [OMG](#) and known as the "Semantics for Business Vocabulary and Rules" (SBVR).

Synonym: [SBVR-Ann 1.1](#)

Namespace URI: <http://www.omg.org/spec/SBVR/20070901/SBVR.xml>

1.3. Vocabulary acronyms

CH-CD 1.0

See: [Conceptual Heaven Concept Diagrams 1.0](#)

CH-SBVR 1.0

See: [Conceptual Heaven for SBVR 1.0](#)

CH-VDOC 1.0

See: [Conceptual Heaven Vocabulary Documents 1.0](#)

LDCE

See: [Longman Dictionary of Contemporary English](#)

SBVR 1.1

See: [Semantics of Business Vocabulary and Rules 1.1](#)

SBVR-Ann 1.1

See: [Semantics of Business Vocabulary and Rules 1.1, Annexes C-D-E](#)

2. General information about this document

2.1 Fundamental concepts

text

Source: [SBVR 1.1](#) ['text' (8.2)]

2.2. Communities and parties

CH

See: [Conceptual Heaven](#)

Conceptual Heaven

See: www.conceptualheaven.com

Synonym: [CH](#)

Object Management Group

See: www.omg.org

Synonym: [OMG](#)

OMG

See: [Object Management Group](#)

2.3. Policies

Homonym Avoidance

Policy: In a business vocabulary, each term must be for exactly one concept.

Example: In aviation, it is imperative to decide whether 'flight' means 'a flight operation that is scheduled periodically, e.g. twice a week, under the same flight number' or 'a particular instance of such a scheduled operation on a particular date'. The term 'flight' is NOT allowed to mean both.

Note: The implication of this policy is that it is not only highly desirable, but also feasible within and between large organisations to invent (or reserve) a different term for each concept within a consistent set of terms and definitions. The design of vocabularies and included sub-vocabularies should be governed primarily by this concern.

Integrity of Text Marking

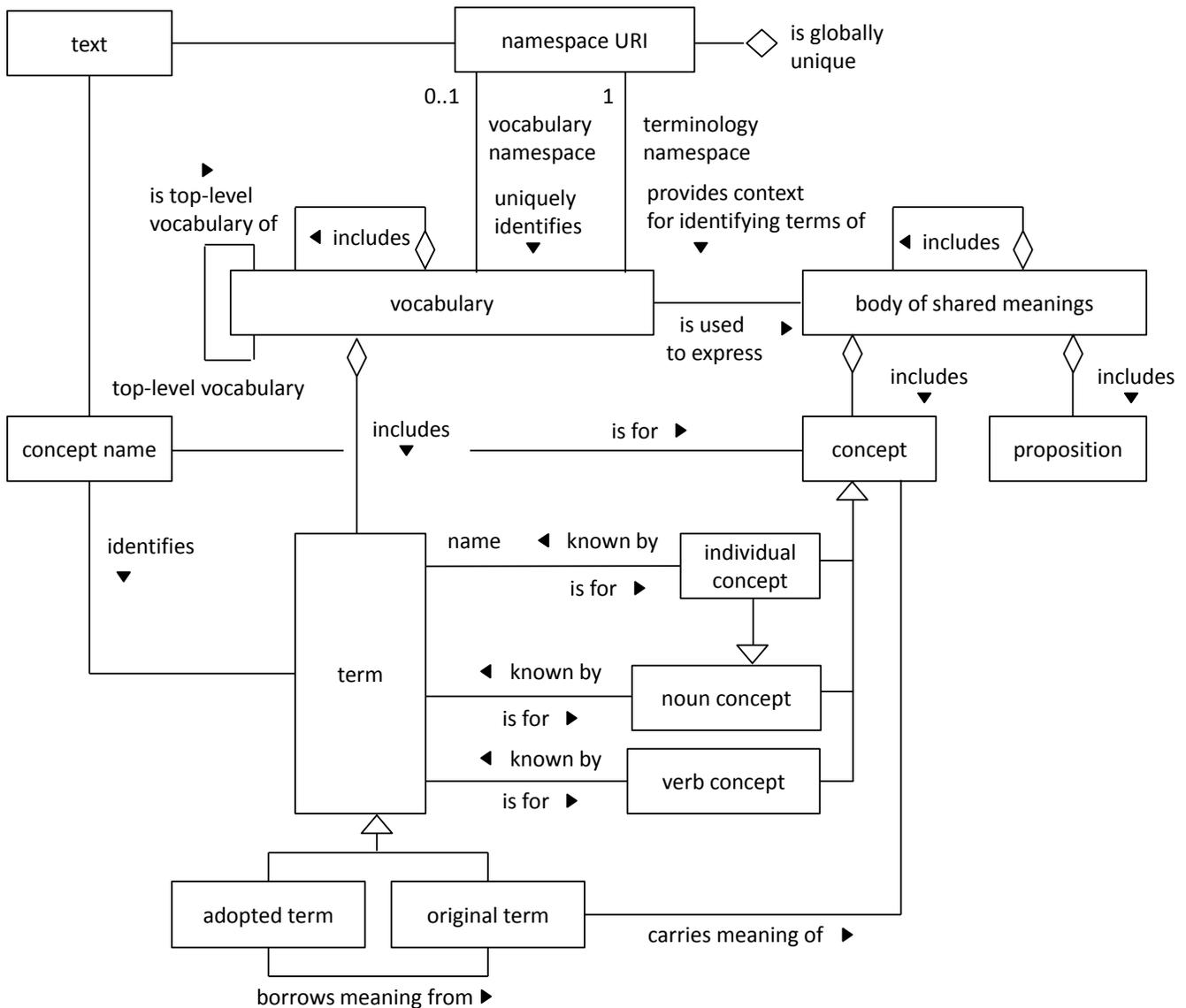
Policy: The basis on which "SBVR-style" color-coding of text is applied must be explicit.

Note: It must be clear what a given example of color-coded marking refers to, and how color-coding must be applied. But also, the necessity or optionality to apply fully-marked or part-marked color coding in specific situations requires specification. One reason for this is that it enables machine-processing of SBVR-style specifications.

Terminology Reference Scheme

Policy: A system must be in place that allows unique identification of each term and traceability of its meaning across documents and vocabularies, whether that term originates, is adopted by, or is quoted in a document.

3. Vocabularies



Adopted terms

This section presents a clearly defined way of working with interrelated terms from multiple vocabularies.

A term from another vocabulary may only be color-coded if an explanation with label "Source" states that the concept that it is for has been *adopted* from a different vocabulary. It is really the underlying concept that is adopted: the term itself may vary between the vocabularies. But whether terms do vary or not, they are necessary for understanding and registering the adoption. Therefore not only concepts, but also terms are thought of as "adopted": in the vocabulary, adopted concepts are concepts "known by adopted terms".

Reference schemes

This section includes reference schemes for terms, concepts and vocabularies, but not for propositions. Terms and vocabularies have a convenient handle (concept names and namespace URIs, respectively) by which they may be referred to; propositions typically do not have such a handle. But beyond this practical issue, there is also a wider discussion that this specification does not aim to settle: if you adopt a concept, how much of the associated knowledge and meaning from the source vocabulary do you really take on? If a source vocabulary has a proposition expressing the rule that each contract must be signed by 2 managers, and you "adopt" the concepts 'contract', 'manager' and 'manager signs contract' from that vocabulary, does that imply that you also "adopt" the rule, or not?

The position on how a *definition* is adopted is well-established in SBVR ('adopted definition', [SBVR 1.1]) and this is also the position endorsed here (see the Note at 'concept is adopted from vocabulary').

As for adopting *rules* and *elements of guidance*, the position implicit in this specification is that you can only adopt these propositions by inventing terminology in the source vocabulary, i.e., by giving names to individual rules, or by including individual rules in named rule sets. You can then adopt this terminology in the same way that you adopt other terms.

adopted term

Definition: A term of which the meaning is defined by referring to the meaning of another term in a different vocabulary.

Necessity: Each term is either an adopted term or an original term.

adopted term borrows meaning from original term

Definition: The meaning of the adopted term is established by referring to the meaning of the original term.

Necessity: The adopted term is included in a different vocabulary than the original term.

body of shared meanings

Source: SBVR 1.1 ['body of shared meanings']

body of shared meanings₁ includes body of shared meanings₂

Source: SBVR 1.1 ['body of shared meanings₁ contains body of shared meanings₂']

body of shared meanings includes concept

Definition: The concept and its relationships to neighbouring concepts contribute to the body of shared meanings.

Note: While not adopted from [SBVR 1.1], this concept is compatible with [SBVR 1.1] in that a 'body of shared meaning' [SBVR 1.1] includes one or 'more bodies of shared concepts' or 'concept models' (sets of concepts shared by the same body of shared meanings and the relationship between these concepts; often referred to as 'fact models') and these 'concept models' in turn include 'concepts'.

body of shared meanings *includes* proposition

Definition: The proposition contributes to the body of shared meanings.

Note: While not adopted from [SBVR 1.1], this concept is compatible with [SBVR 1.1] on the basis of the use of "meaning" in the term 'body of shared meanings' and the fact that [SBVR 1.1 (8.1)] qualifies a 'proposition' as a 'meaning' [SBVR 1.1, 8.1].

concept

Source: SBVR 1.1 ['concept']

concept name *is for* concept

Definition: The concept name *identifies* the term that the concept *is known by*.

concept name *identifies* term

Definition: The concept name helps to refer uniquely to the term.

concept name *is represented by* text

individual concept *is known by* term

See: term *is for* individual concept

name

Role in: term *is for* individual concept

namespace URI

namespace URI *is globally unique*

namespace URI *is represented by* text

namespace URI *provides context for identifying terms of* vocabulary

Based on: Homonym Avoidance [(2.3)]

Based on: [Terminology Reference Scheme](#) [(2.3)]

Role: The term '[terminology namespace](#)' is used to refer to a [namespace URI](#) in its role of *providing context for identifying terms of* the [vocabulary](#).

Necessity: *The [terminology namespace](#) of a [vocabulary](#) is the [vocabulary namespace](#) of that [vocabulary's](#) [top-level vocabulary](#).*

Necessity: *Each [vocabulary](#) has exactly [one](#) [terminology namespace](#).*

[namespace URI](#) *uniquely identifies* [vocabulary](#)

Definition: The [namespace URI](#) identifies the [vocabulary](#) and does not identify any other [vocabulary](#)

Role: The term '[vocabulary namespace](#)' is used to refer to a [namespace URI](#) in its role of *uniquely identifying* a [vocabulary](#)

Necessity: *A [vocabulary](#) may not have more than [one](#) [vocabulary namespace](#).*

Necessity: *A [top-level vocabulary](#) must have exactly [one](#) [vocabulary namespace](#).*

Possibility: *A [vocabulary](#) that is not a [top-level vocabulary](#) may have a [vocabulary namespace](#).*

[noun concept](#) *is known by* [term](#)

See: [term](#) *is for* [noun concept](#)

[original term](#)

Definition: A [term](#) that is declared without reference to any term from a different [vocabulary](#).

Necessity: *Each [term](#) is either an [adopted term](#) or an [original term](#).*

[original term](#) carries meaning of [concept](#)

Definition: The meaning of the [concept](#) is understood and made available through the existence of the [original term](#).

Definition: The [concept](#) historically originates in the coining of the [original term](#).

Necessity: *The [vocabulary](#) that contains the [original term](#) is used to express the [body of shared meanings](#) that contains the [concept](#).*

Necessity: *The meaning of a [concept](#) is carried by exactly [one](#) [original term](#).*

[term](#)

Definition: Expression in a language that evokes a concept in a subject field to members of a speech community that are united by the use of a [vocabulary](#).

Dictionary basis: "A word or expression with a special meaning or used in a particular activity, job, profession, etc." [LDCE]

Reference: The combination of the concept name that *identifies* the term and the terminology namespace of the vocabulary that *includes* the term.

Note: 'Term' in [SBVR 1.1] is restricted to general concepts. Here, it is extended to verb concepts, roles and individual concepts. One rationale for this is to present a simplified version of the SBVR metamodel for practical purposes. The other is that it is desirable to promote the use of "terminology" and glossaries of "terms and definitions" in businesses not only for noun concepts but also for verb concepts.

Note: The definition in this glossary item, like [SBVR 1.1], takes as essential characteristics of a 'term' (1) the fact that it is a verbal designation as opposed to, e.g., an icon, and (2) the fact that it carries the meaning of 'expression carefully chosen to illuminate an understanding that is specific to a particular field of activity or knowledge'. Unlike [SBVR 1.1], it regards as accidental the fact that 'term' is more often used for general concepts than for verb concepts.

terminology namespace

Role in: namespace URI *provides context for identifying terms of* vocabulary

Role in: vocabulary document *specifies* namespace URI *that provides context for identifying terms of* vocabulary

term is for noun concept

Definition: The term represents the noun concept in a given subject field for the members of the speech community that use the vocabulary.

Syn. form: noun concept *is known by* term

Note: 'Term' [SBVR 1.1] is not for all noun concepts, but only for general concepts. See the glossary entry for 'term'.

term is for individual concept

Definition: The term represents the individual concept in a given subject field for the members of the speech community that use the vocabulary.

Syn. form: individual concept *is known by* term

Role: The term 'name' is used to refer to a term in its role as term for an individual concept.

Note: 'Term' [SBVR 1.1] is not for individual concepts, only for general concepts. See the glossary entry for 'term'.

term is for verb concept

Definition: The term represents the verb concept in a given subject field for the members of the speech community that use the vocabulary.

Syn. form: verb concept *is known by* term

Note: 'Term' [SBVR 1.1] is not for verb concepts, only for general concepts. See the glossary entry for

'term'.

top-level vocabulary

Role in: vocabulary₁ *is top-level vocabulary of* vocabulary₂

verb concept is known by term

See: term is for verb concept

vocabulary

Definition: Set of terms primarily drawn from a single language to express concepts within a body of shared meanings.

Source: SBVR 1.1 ['vocabulary']

Note: This is a concept adopted from [SBVR 1.1]. The definition in [SBVR 1.1] is: "Set of designations and verb concept wordings drawn from a single language to express concepts within a body of shared meanings". The difference with the definition proposed here is closely related to the different meaning of 'term'. For discussion, see the glossary entry for 'term'.

vocabulary includes term

vocabulary₁ *includes* vocabulary₂

Source: SBVR 1.1 ['vocabulary₁ incorporates vocabulary₂']

Note: A good reason for having a vocabulary include other vocabularies is to present a specific part of a body of shared meanings to external parties for specific purposes. For example, SBVR includes vocabularies to enable it to define compliance criteria for an individual included vocabulary.

Note: If your only purpose is to subdivide material into subject fields, consider using clauses instead of included vocabularies.

vocabulary is used to express body of shared meanings

Source: SBVR 1.1 ['vocabulary is used to express body of shared meanings']

vocabulary₁ *is top-level vocabulary of* vocabulary₂

Definition: Either vocabulary₂ is not included in another vocabulary and vocabulary₁ is the same as vocabulary₂, or vocabulary₂ is included in another vocabulary and vocabulary₁ is the highest-level parent vocabulary that includes vocabulary₂.

Role: The term 'top-level vocabulary' is used to refer to a vocabulary in its role of *being* the *top-level vocabulary* of another vocabulary.

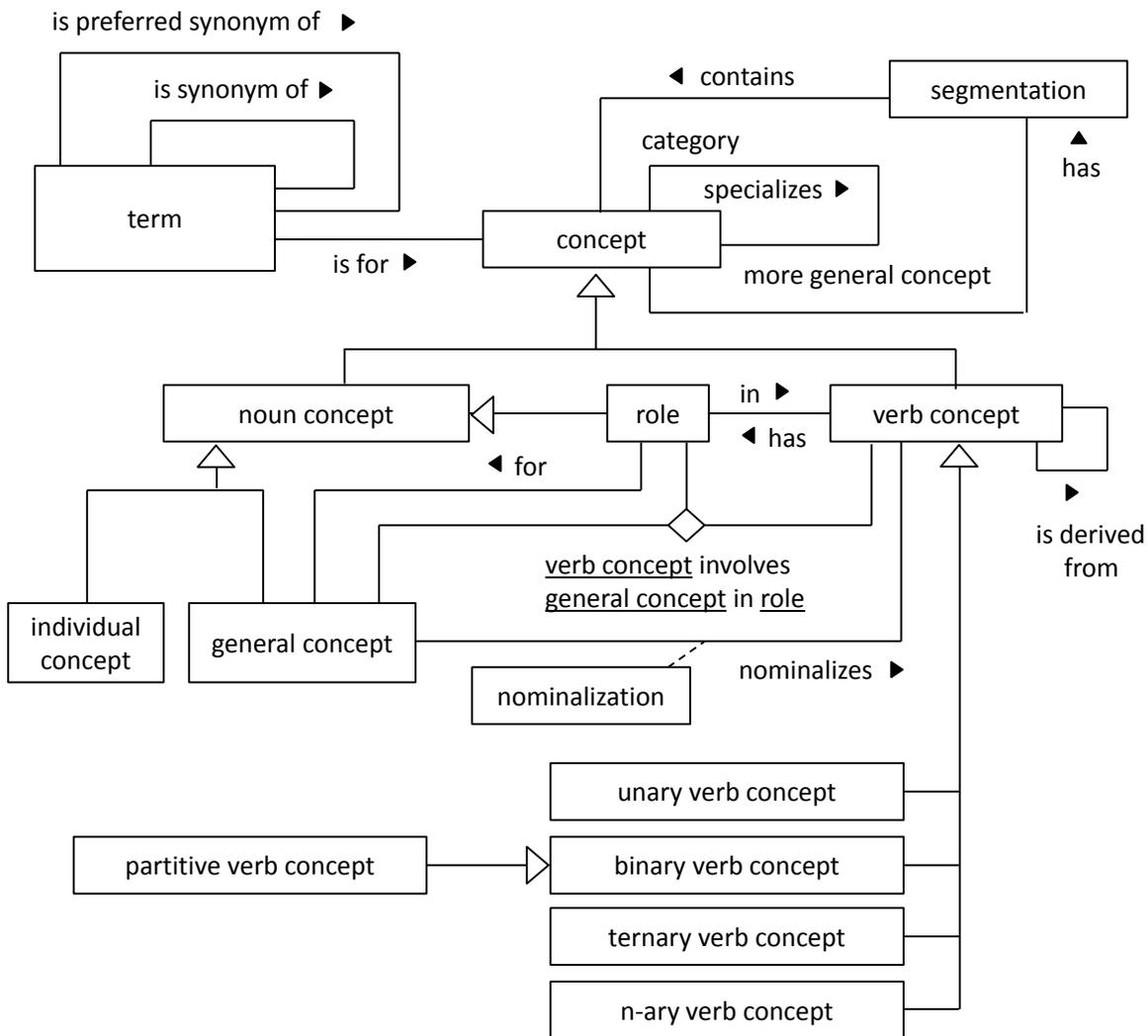
Note: In the definition of this term, 'includes' is allowed to be recursive: If vocabulary A includes B and B includes C, then A is understood to include C.

vocabulary namespace

Role in: [namespace URI](#) *uniquely identifies* [vocabulary](#)

Role in: [vocabulary document](#) *specifies* [namespace URI](#) *that uniquely identifies* [vocabulary](#)

4. Concepts



binary verb concept

Definition: A [verb concept](#) that *has exactly* [two roles](#).

Source: [SBVR 1.1](#) ['binary verb concept']

category

Role in: concept₁ *specializes* concept₂

Role in: segmentation *contains* concept

concept *has* segmentation

Role: The term 'more general concept' is used to refer to a concept in its role of a concept that *has* a segmentation.

concept₁ *specializes* concept₂

Definition: The concept₁ incorporates each characteristic that is incorporated by the concept₂ plus at least one differentiator.

Source: SBVR 1.1 ['concept₁ specializes concept₂']

Example: 'Van' specializes 'vehicle' because vans have all the characteristics of a vehicle (mode of propulsion, intended for transport, etc.) but have also differentiators, i.e., special characteristics not shared by all vehicles (intended for the transport of goods, etc.)

Role: The term 'category' is used to refer to a concept in its role of a concept that *specializes* another general concept.

Role: The term 'more general concept' is used to refer to a concept in its role of a concept that *is specialized by* another concept.

general concept

Source: SBVR 1.1 ['general concept']

Category of: noun concept

general concept *nominalizes* verb concept

Definition: Each instance of the general concept corresponds to an actuality of the verb concept and there are no actualities of the verb concept that are not instances of the general concept.

Example: 'Rental request' nominalizes 'customer requests rental'.

Source: SBVR 1.1 ['general concept objectifies verb concept']

individual concept

Source: SBVR 1.1 ['individual concept']

Category of: general concept

more general concept

Role in: concept₁ *specializes* concept₂

Role in: concept *has* segmentation

n-ary verb concept

Definition: A verb concept that *has* more than three roles.

nominalization

Definition: The fact that a general concept *nominalizes* a verb concept.

Source: SBVR 1.1 ['verb concept objectification']

noun concept

Source: SBVR 1.1 ['noun concept']

Category of: concept

Necessity: Each noun concept is either a general concept or an individual concept.

partitive verb concept

Source: SBVR 1.1 ['partitive verb concept']

Definition: A binary verb concept that corresponds to parts making up a whole, or being included or contained in a whole.

Example: The verb concept 'rental organization unit *is located in* local area'

Note: The concept implies that each thing contained is contained in exactly one whole. In the example, each rental organization unit is located in exactly one local area.

preferred synonym

Role in: term₁ *is preferred synonym of* term₂

role

Definition: Noun concept that corresponds to things based on their playing a part, assuming a function or being used in a state of affairs that corresponds to a verb concept

Source: SBVR 1.1 ['verb concept role']. The definition given here combines elements of the definitions of 'verb concept role' [SBVR 1.1] and its more general concept 'role' [SBVR 1.1].

Category of: noun concept

Example: The role 'employee' is the concept that specific persons are involved in states of affairs that correspond to the verb concept 'company employs person', namely, in arrangements whereby

these persons are employed by specific companies.

role is for general concept

Definition: The verb concept that *has the role involves the general concept in the role*

segmentation

Source: SBVR 1.1 ['segmentation']

Necessity: Each instance of the more general concept of a segmentation must be an instance of exactly one of the categories of the segmentation.

Example: A concept 'point of sale' has a segmentation into 'airport agency', 'city agency' and 'hotel desk'. Each point of sale falls into exactly one of these three categories. There is no other category.

Note: Segmentation may be expressed in a vocabulary document by structural rules stating that the categories in the segmentation are mutually exclusive and complete with respect to the more general concept.

Note: In [SBVR 1.1] segmentation is a category of categorization schemes and categorization schemes are individual concepts. In [SBVR-Ann 1.1] the names of categorization schemes are depicted next to the category symbols in individual-concept marking.

segmentation contains concept

Role: The term 'category' is used to refer to a concept in its role as a concept contained by a segmentation.

Necessity: A segmentation must *have at least two categories*.

synonym

Role in: term₁ *is synonym of* term₂

term₁ is synonym of term₂

Definition: The term₁ *is for the same concept as the term₂*.

Role: The term 'synonym' is used to refer to a term in its role of *synonym of* another term.

Possibility: A term that *is synonym of another term may or may not be preferred synonym of that other term*.

term₁ is preferred synonym of term₂

Definition: The speech community favours the use of the term₁ over that of the term₂ and any other terms that may be synonym of the term₂.

Role: The term 'preferred synonym' is used to designate a term that *is preferred synonym of* another term.

Necessity: In a group of terms that *are synonym of each other*, there may *be* at most one preferred synonym.

Necessity: A term that *is preferred synonym of another term* is synonym of that other term.

ternary verb concept

Definition: A verb concept that *has exactly* three roles.

unary verb concept

Definition: A verb concept that *has exactly* one role.

Source: SBVR 1.1 ['unary verb concept']

verb concept

Source: SBVR 1.1 ['verb concept']

Category of: concept

verb concept has role

Definition: The verb concept *involves* a general concept *in the* role.

verb concept involves general concept in role

Definition: Instances of the general concept are involved in the specific capacity that corresponds to the role in states of affairs that correspond to the verb concept

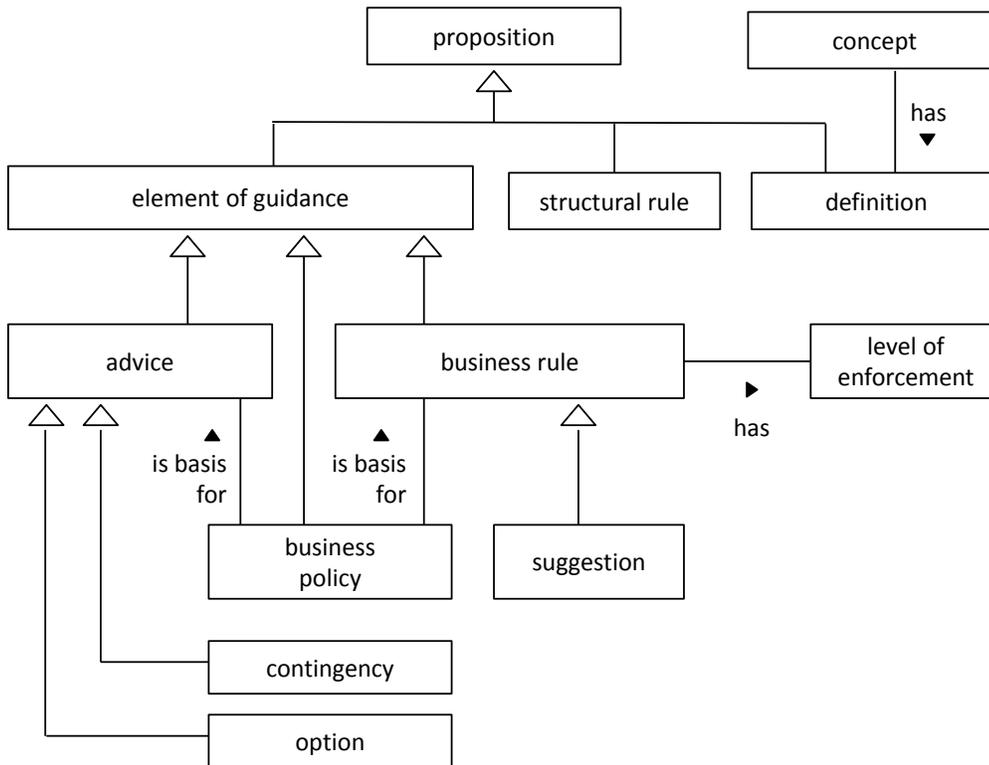
Example: Individuals are involved in employment arrangements in the capacity of being employed. In this example, the individuals are instances of the noun concept 'person', the employment arrangements are states of affairs corresponding to the verb concept 'company employs person', and the capacity of being employed corresponds to the role 'employee'.

verb concept₁ is derived from verb concept₂

Definition: Verb concept₁ is logically inferred from *the fact that the* verb concept₂ *has a role for a more general concept of a noun concept for which the* verb concept *has a* role.

Example: 'Point of sale has address' is derived from 'location has address' on the basis of 'location' being a more general concept of 'point of sale'.

5. Propositions



advice

Source: [SBVR 1.1](#) ['advice']

Category of: [element of guidance](#)

Note: Unfortunately, the everyday meaning of the word 'advice' does not match the rather technical meaning that 'advice' has in [SBVR 1.1], namely, a statement of possibility, contingency, permission or optionality. Defined in [LDCE] as "opinion given by one person to another on how that other should behave or act", the everyday meaning of 'advice' seems much closer to 'business rule [SBVR 1.1] with a limited level of enforcement [SBVR 1.1]'.

Note: It is easy to confound [suggestions](#) and [advices](#). The English word "advice" overlaps with [suggestion](#) ("it is suggested that ..."), but in [SBVR 1.1](#) '[advice](#)' has a different and more formal meaning inspired by modal logic ("it is possible, or not necessary, or permitted, or not forbidden, that..."). For reasons of compliance, it is the latter meaning that is adopted in this document.

business policy

Source: [SBVR 1.1](#) ['business policy']

Category of: [element of guidance](#)

business policy is basis for advice

Source: [SBVR 1.1](#) ['business policy is basis for advice']

business policy is basis for business rule

Source: [SBVR 1.1](#) ['business policy is basis for business rule']

business rule

Source: [SBVR 1.1](#) ['business rule']

Category of: [element of guidance](#)

business rule has level of enforcement

Definition: The [business rule](#) is an 'operative business rule' [SBVR 1.1] that has the [level of enforcement](#) [SBVR 1.1]

Source: [SBVR 1.1](#) ['operative business rule has level of enforcement']

concept has definition

Definition: The [definition](#) aims to express the meaning of the [concept](#) with the purpose of clarifying or formalizing that meaning.

contingency

Source: [SBVR 1.1](#) ['advice of contingency']

Category of: [advice](#)

definition

Definition: A proposition that aims to express the meaning of a concept with the purpose of clarifying or formalizing that meaning.

Category of: [proposition](#)

Note: In [SBVR 1.1], the term 'definition' is used in relation with the representation of the concept being defined. In this document, the term 'definition' is used to designate a type of statement. The underlying concept is fundamentally the same in the two vocabularies.

element of guidance

Source: [SBVR 1.1](#) ['element of guidance']

Category of: [proposition](#)

level of enforcement

Source: [SBVR 1.1](#) ['level of enforcement']

option

Source: [SBVR 1.1](#) ['advice of optionality']

Category of: [advice](#)

proposition

Source: [SBVR 1.1](#) ['proposition']

structural rule

Source: [SBVR 1.1](#) ['structural rule']

Category of: [proposition](#)

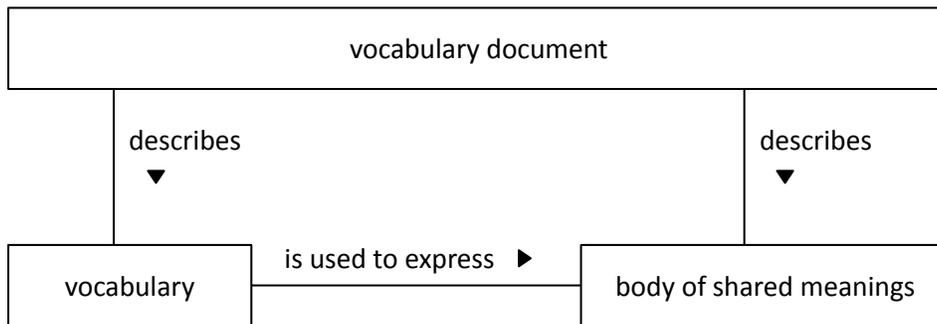
suggestion

Definition: A [business rule](#) that *has* a [level of enforcement](#) of limited severity.

Category of: [business rule](#)

Note: The [level of enforcement](#) that [suggestions](#) *have* is comparable to the "guideline" level in OMG's Business Motivation Model (BMM) as quoted by [[SBVR 1.1 \(12.1.3\)](#)].

6. Vocabulary documents



vocabulary document

Definition: A document that uses the document format specified by [CH-SBVR], more specifically by part III of this document and by the document "Conceptual Heaven Concept Diagrams", with the purpose of describing and clarifying a body of shared meanings understood as a structured collection of concepts, definitions, rules and elements of guidance that unites a semantic community in dealing with a specific subject field.

Note: This format is very similar to the documentation style advocated in Annexes C-D-E of [SBVR-Ann 1.1]. Compared to [SBVR-Ann 1.1], it has alterations and simplifications. In particular, it aims to reduce the number of different constructs and entries, as well as the number of different drawing objects in diagrams.

vocabulary document describes body of shared meanings

Necessity: A vocabulary document must *describe* exactly one body of shared meanings.

Necessity: A vocabulary document must offer a full account of the body of shared meanings it *describes*.

Note: The document must describe all the concepts, rules and elements of guidance that unite a semantic community in dealing with a particular subject field. On the other hand, the document itself is also instrumental in *conceiving* of this body of knowledge and defining its boundaries and characteristics.

vocabulary document describes vocabulary

Definition: The vocabulary document presents the terms included in the vocabulary, provides definitions of the concepts that these terms are for, and indicates relationships between concepts and terms.

Role: The term 'subject vocabulary' is used to refer to a vocabulary in its role *of being described by* a vocabulary document.

Necessity: A vocabulary document must offer a full account of the vocabulary that *is used to express* the body of shared meanings described by the vocabulary document.

Note: The document must describe all the concepts that a semantic community uses to deal with a particular subject field as well as the structure that connects these concepts. On the other hand, the document itself is also instrumental in *conceiving* of this vocabulary and defining its

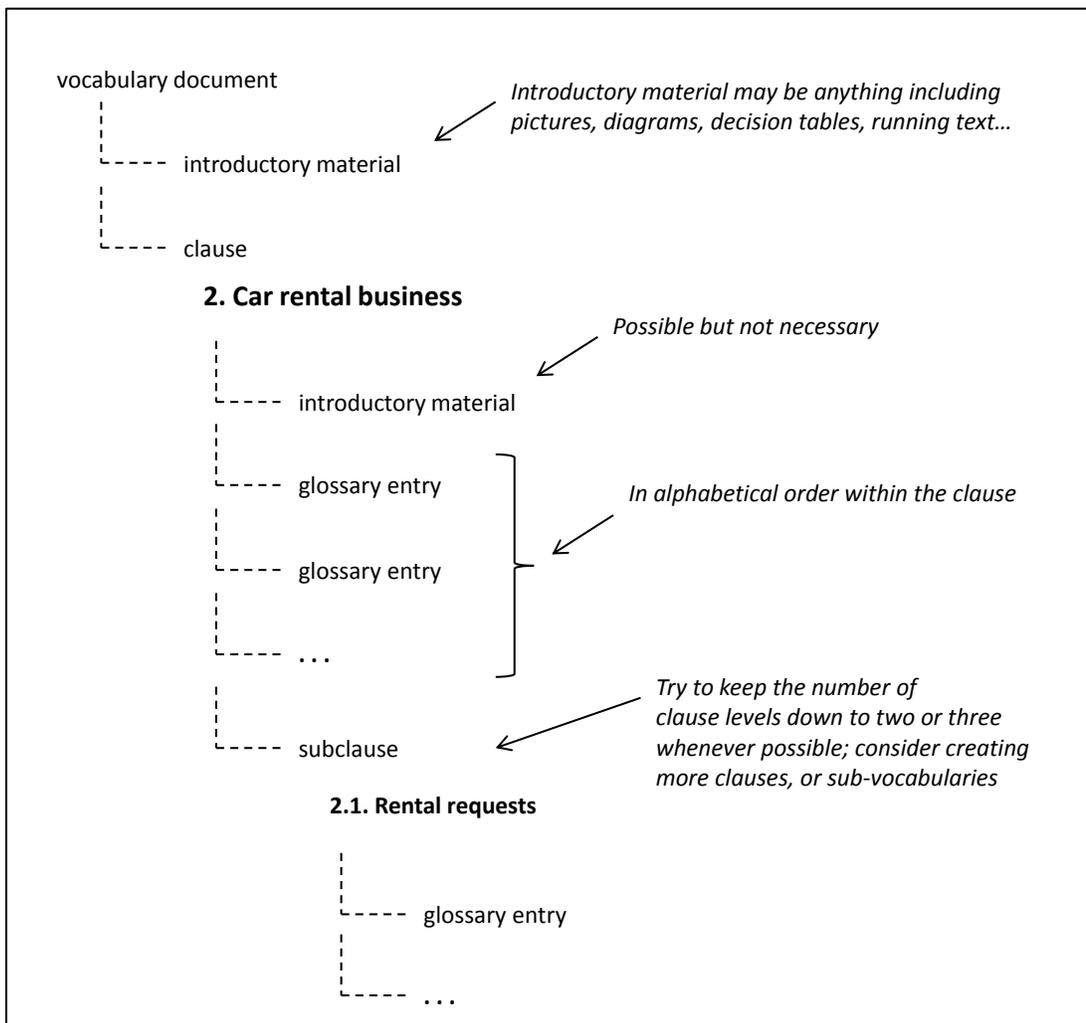
structure, extent and level of detail.

Necessity: **A vocabulary document must describe exactly one vocabulary.**

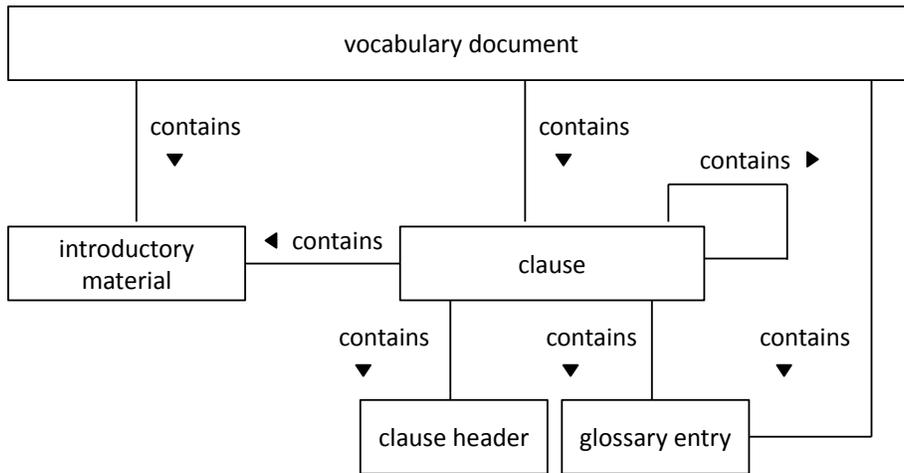
Note: If terms declared in the vocabulary document are in an included vocabulary, consider registering the top-level vocabulary of that included vocabulary as the subject vocabulary, and not the included vocabulary itself. This is because a term is uniquely identifiable by the combination of its concept name and the namespace URI of its top-level vocabulary.

Note: Physical document organization is beyond the scope of this specification. It is of course possible to have a single publication (e.g., a paper book) that is a collection of distinct vocabulary documents describing distinct subject vocabularies.

7. Document structure



7.1. Document sections



clause

Definition: A physical section of a document that is identified by a header and that meaningfully groups a subset of the document's contents.

clause₁ contains clause₂

Possibility: A clause contained in a clause may itself contain further subclauses, creating a tree hierarchy of clauses or chapters.

Note: In a vocabulary document, it is helpful to avoid complex clause hierarchies. Try to keep the number of levels down to two or three where you can. If your material is complex, consider breaking it up in multiple vocabularies described in multiple documents.

clause contains glossary entry

Necessity: Glossary entries contained in a clause must be listed alphabetically.

clause contains introductory material

Necessity: The introductory material contained by a clause (if any) must precede the glossary entries contained by that clause in the document order.

clause has clause header

clause header

Definition: Section header that presents a title for a clause's content.

introductory material

Definition: Any document content in a vocabulary document other than glossary entries.

Contingency: Introductory material does not need to be text-only. It may contain pictures, tables and diagrams.

vocabulary document contains clause

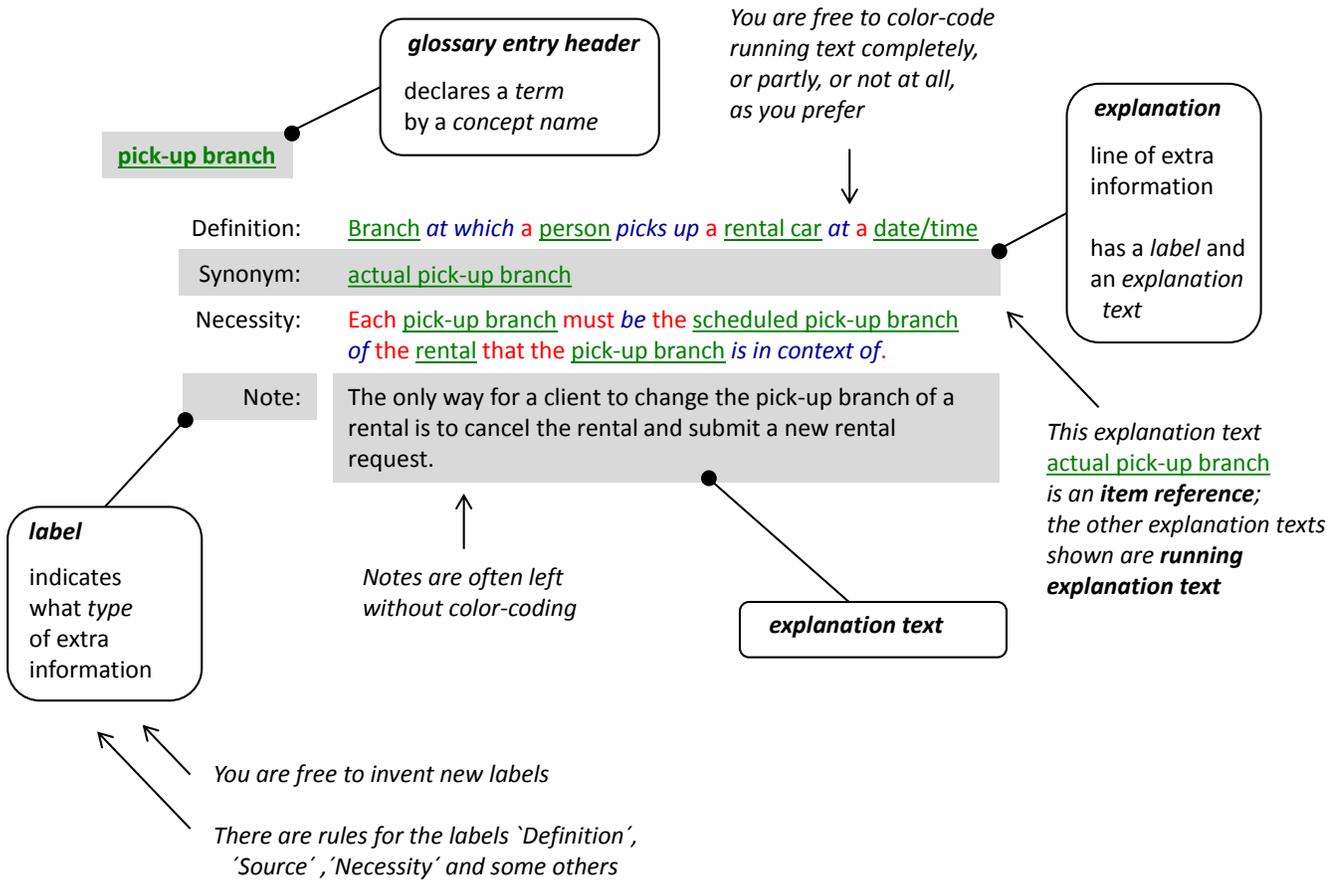
vocabulary document contains glossary entry

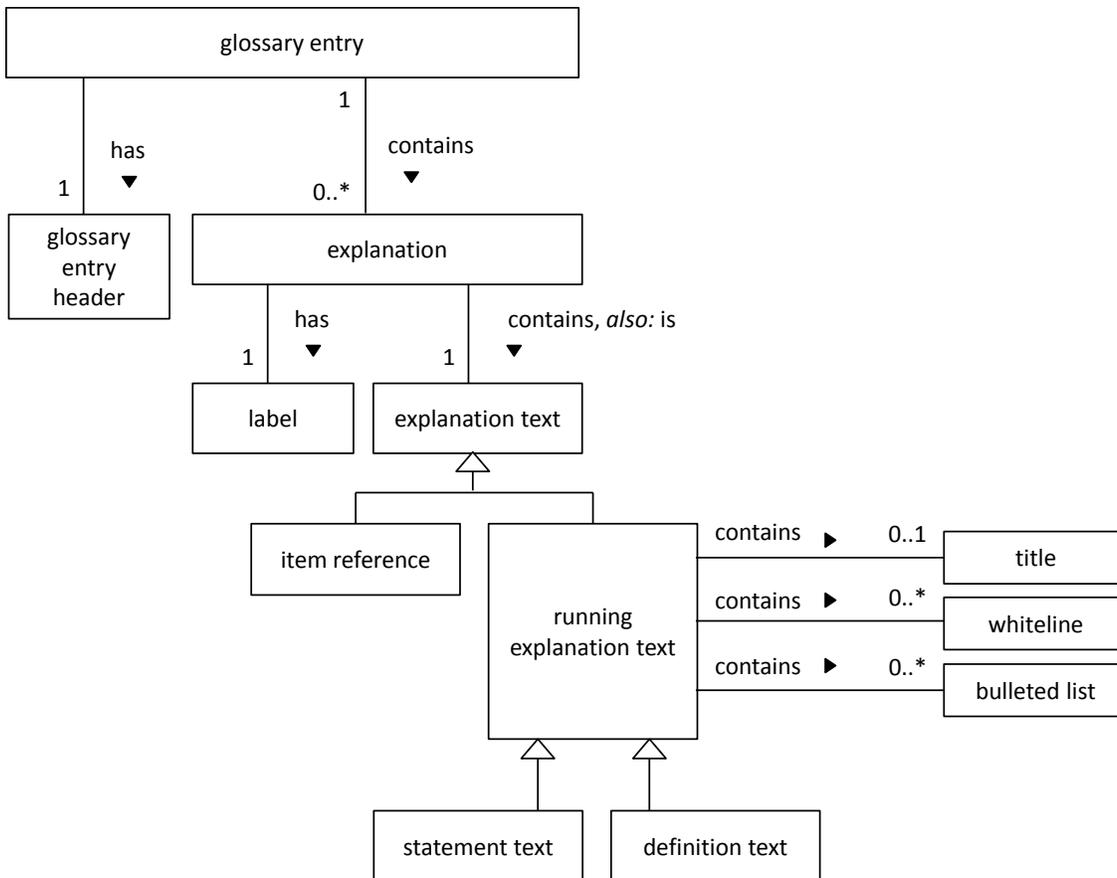
Definition: The vocabulary document *contains* a clause that *contains* the glossary entry.

vocabulary document contains introductory material

Necessity: The introductory material *contained by* a vocabulary document must precede the vocabulary document's clauses in the document order.

7.2. Glossary entries





bulleted list

definition text

Definition: A running explanation text that *states* a definition and typically has the grammatical form of a nominal clause, that is, not a full sentence.

Example: "A four-wheel motorised vehicle primarily intended for the transport of persons" as a definition text defining the concept of 'car'.

explanation

Definition: An element of specification contained in a glossary entry to further the understanding of the concept declared by the glossary entry or its relationship with surrounding concepts.

Definition: The combination of a label and an explanation text.

Note: Visually, an explanation is a horizontal row in a two-column tabular arrangement with the label in the left-hand column and the explanation text in the right-hand column.

explanation has label

Necessity: Each explanation *has exactly one* label.

explanation contains explanation text

Necessity: Each explanation contains exactly one explanation text.

Syn.form: explanation is explanation text

explanation is explanation text

See: explanation contains explanation text

Note: This verb form is provided as a shortcut for use in rule statements.

explanation text

Definition: The text in the right-hand column of an explanation; the part of an explanation that is not the explanation's label.

Necessity: Each explanation text is either an item reference or running explanation text.

Note: Explanation text is placed in the right-hand column of a tabular arrangement of explanations.

Note: Explanation text is left-aligned with other explanation text in the same tabular arrangement (if any).

glossary entry

glossary entry contains explanation

Possibility: A glossary entry may contain any number of explanations.

Possibility: A glossary entry may contain multiple explanations with the same label.

Possibility: A glossary entry may contain no explanations at all.

Note: It is often helpful to include an explanation with label "Definition" in a glossary entry.

Note: If a glossary entry has an explanation with label "Definition" it is usually helpful to place this definition at the top of the list of explanations.

Note: Explanations contained by a glossary entry may be listed in any order. It is not necessary, and usually not helpful, to sort explanations alphabetically by label.

glossary entry has glossary entry header

Necessity: Each glossary entry has exactly one glossary entry header.

glossary entry header

item reference

Definition: Explanation text that is used to *refer to* a concept and has a form identical to the form of the glossary entry that *declares* that concept.

Example: "customer rents car"

Necessity: No item reference *is* running explanation text.

Necessity: An item reference **must not** contain interpunction symbols.

Note: It is good form to *avoid* a full stop at the end of an item reference.

label

Definition: An element of specification indicating the intention of an explanation by a single word or phrase.

Example: "Definition:"

Necessity: A label may not have marking: it must have a black font color, no italic style, and no underlining. Unlike glossary entries, item references, and running explanation text that *has* marking, labels may not express anything by font color, font style or underlining.

Contingency: While this specification contains many rules and suggestions about often-used labels such as "Definition:", the set of allowed labels is not a closed set; authors are allowed to invent labels of their own.

Note: A label is placed in the left-hand column of the tabular arrangement of explanations.

Note: A label is right-aligned with other labels in the same tabular arrangement (if any).

Note: It is customary to start each label with a capital letter and to end each label with a colon (:).

running explanation text

Definition: An explanation text that is not used to *refer to* a specific item but rather consists of a larger body of text, such as a full grammatical sentence.

Possibility: Running explanation text **may** contain all commonly used interpunction symbols.

Note: It is good form to place a full stop at the end of running explanation text that constitutes a full grammatical sentence, such as a business rule.

Note: It is good form to *avoid* a full stop at the end of running explanation text that does *not* constitute a full grammatical sentence, such as a definition text.

running explanation text contains bulleted list

Possibility: A running explanation text **may contain** a bulleted list.

Note: It is recommended to use only one-level bulleted lists (i.e., to avoid bullets that have sub-bullets) and to keep the use of bulleted lists down to a minimum.

running explanation text contains whieline

Possibility: A running explanation text **may contain** whielines.

running explanation text contains title

Possibility: A running explanation text may *contain* a title.

Note: In the case of named rules such as "Driver Rule 1", consider using glossary entries with that name, or labels with that name in a glossary entry for a rule set, as an alternative to titles in running explanation text.

statement text

Definition: A running explanation text that *states* an element of guidance or a structural rule and that typically has the grammatical form of a full sentence.

Example: "Each rental is either a one-way rental or a return rental".

title

Definition: Initial text element separated from the remainder of a running explanation text by a whiteline.

Note: It is good form to *avoid* a full stop at the end of a title.

whiteline

8. Concepts in the document

8.1. Concept naming

concept name

Definition: A case-sensitive text form for a given concept, standardised by Concept Naming Rules, and by which the concept may be singled out and explicitly referred to.

Note: Concept names contrasts with noun forms and verb forms that appear in running explanation texts. Noun forms and verb forms are mentions (or: occurrences) of a concept that do not have a single standardised form.

Concept Naming Rules

Note: This rule set specifies the *linguistic form* of concept names. For the *visual appearance* of concept names, please refer to later sections in this chapter.

Necessity: The concept name *for* an individual concept is the (case-sensitive) name that is given to the instance of the individual concept.

Example: EU-Rent

Necessity: The concept name *for* a general concept is the singular form of the noun or noun phrase that designates the general concept. Case spelling must be all-lowercase except when part of a noun phrase refers to a name for an individual concept.

Example: customer
Example: Gold Card customer

Necessity: The [concept name](#) *for* a [unary verb concept](#) is the concept name for the noun concept that is involved in the role, followed by a space, followed by the third person singular of the predicate that expresses the verb concept, which is nearly always the form "is" of the verb 'to be' combined with either an adjective or a participle:

Example: car is available
Example: Gold Card rental is cancelled
Example: passenger smokes

Necessity: The [concept name](#) *for* a [binary verb concept](#) is the concept name for the noun concept that is involved in the left-hand role, followed by the third person singular of the verb or verb phrase that expresses the verb concept, followed by the concept name for the noun concept that is involved in the right-hand role, with spaces separating the verb form from the noun forms. In the case of a prepositional verb, the preposition is placed near the verb and not at the end:

Example: customer rents car
Example: customer picks up car

8.2. Concept name appearance

This section deals with the visual appearance of [concept names](#) in both marked and unmarked text. The *language form* of concept names is dealt with in section 8.1. The visual properties of various types of marking are dealt with in section 8.3.

In **marked** text:

- Concept names for noun concepts are marked with general-concept marking or individual-concept marking, as appropriate.
- Concept names for verb concepts are marked with verb-concept marking, except for the noun forms for the noun concepts involved by the verb concept in its role(s); these noun forms are marked with general-concept marking or individual-concept marking, as appropriate.

In **unmarked** text:

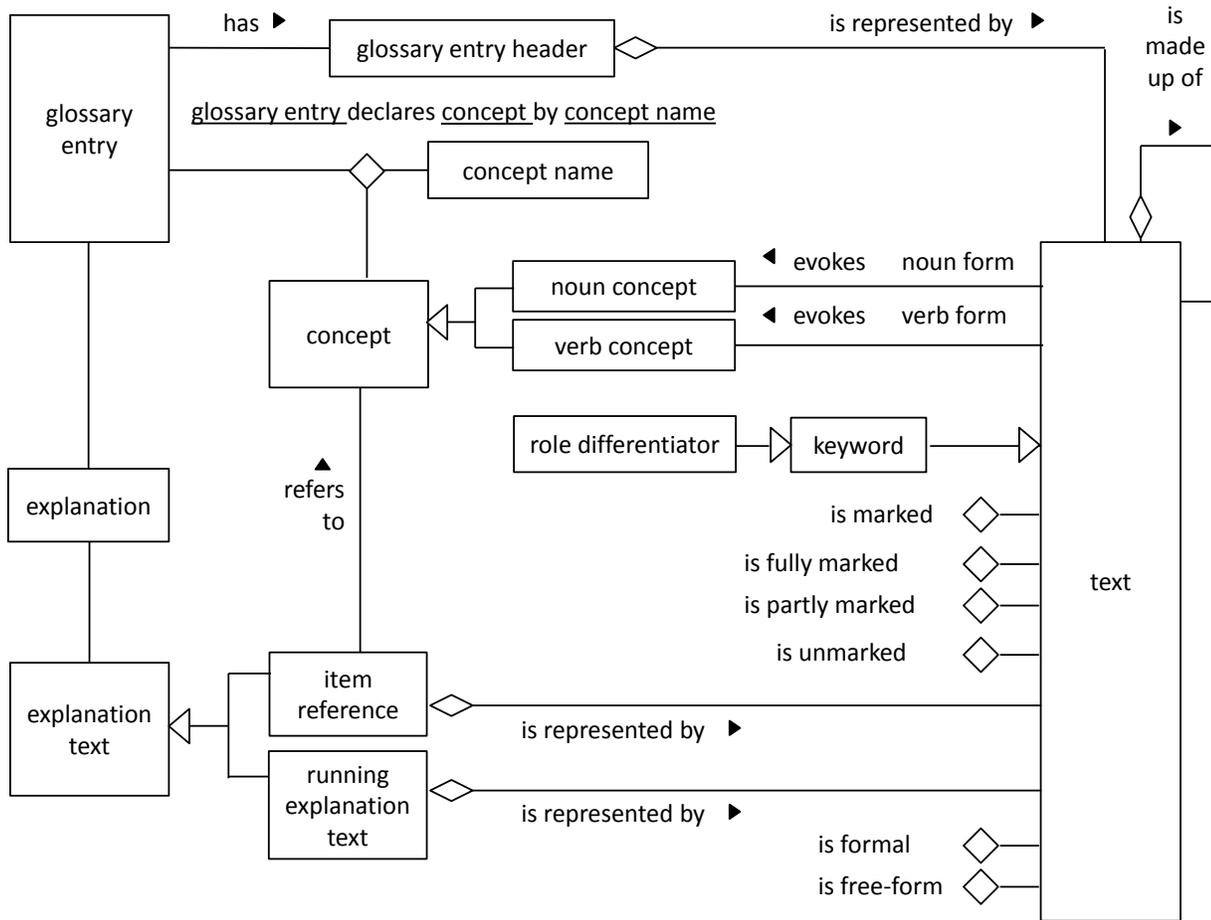
- Concept names may appear as in marked text, but without the contrasting font colors.
- Alternatively, italic font may also be omitted, in which case the only remaining clue for recognising verb forms is the absence of underlining. This works well even with n-ary verb concepts, because verb forms and noun forms tend to neatly alternate.

You may also refer to a concept by enclosing the concept name in *single quotes*. This contrasts with *double quotes*, which indicate that you refer to the enclosed text in its capacity as a string of characters. Concept names often appear quoted. This happens for example when the concept is discussed in a commentary or when a reference is made to a concept name by which the concept was declared in a different vocabulary, particularly, in explanations with label "Source:".

- In fully marked text, some practitioners like to color the quote marks as keywords (red font color).
- Quotes delimit a concept name, thereby making other visual clues less important. Consequently, using quotes, you can successfully refer to a concept without using any color, italic font or underlining at all.
- Note that in quoted *verb* concepts, if you leave out any other visual clues, readers are left to infer which parts of the concept name are noun forms and which parts are verb forms.

Concept name for	Appearance in marked text	Appearance in unmarked text	Appearance when quoted (marked, unmarked)
General concept	<u>customer</u>	<u>customer</u>	' <u>customer</u> ' ' <u>customer</u> ' ' <u>customer</u> ' ' <u>customer</u> '
General concept	<u>Gold Card customer</u>	<u>Gold Card customer</u>	' <u>Gold Card customer</u> ' ' <u>Gold Card customer</u> ' ' <u>Gold Card customer</u> ' ' <u>Gold Card customer</u> '
Individual concept	<u>EU-Rent</u>	<u>EU-Rent</u>	' <u>EU-Rent</u> ' ' <u>EU-Rent</u> ' ' <u>EU-Rent</u> ' ' <u>EU-Rent</u> '
Unary verb concept	<u>driving license</u> <i>is valid</i>	<u>driving license</u> <i>is valid</i> <u>driving license</u> is valid	' <u>driving license</u> <i>is valid</i> ' ' <u>driving license</u> <i>is valid</i> ' ' <u>driving license</u> <i>is valid</i> ' ' <u>driving license</u> is valid' ' <u>driving license</u> is valid'
Binary very concept	<u>customer</u> <i>rents</i> <u>car</u>	<u>customer</u> <i>rents</i> <u>car</u> <u>customer</u> rents <u>car</u>	' <u>customer</u> <i>rents</i> <u>car</u> ' ' <u>customer</u> <i>rents</i> <u>car</u> ' ' <u>customer</u> <i>rents</i> <u>car</u> ' ' <u>customer</u> rents <u>car</u> ' ' <u>customer</u> rents <u>car</u> '
N-ary verb concept	<u>customer</u> <i>picks up</i> <u>car</u> <i>from</i> <u>branch</u>	<u>customer</u> <i>picks up</i> <u>car</u> <i>from</i> <u>branch</u> <u>customer</u> <i>picks up</i> <u>car</u> <i>from</i> <u>branch</u>	' <u>customer</u> <i>picks up</i> <u>car</u> <i>from</i> <u>branch</u> ' ' <u>customer</u> <i>picks up</i> <u>car</u> <i>from</i> <u>branch</u> '

8.3. Markings in the document



glossary entry declares concept by concept name

Definition: By exhibiting the concept name, the glossary entry header of the glossary entry testifies of the existence of the concept in the vocabulary described.

Note: On the choice of modelling this as a ternary verb concept, see Annex C, "Notes on ternary and n-ary verb concepts".

glossary entry header is made up of text

Necessity: A glossary entry header must be made up of text that is fully marked.

Necessity: A glossary entry header may not contain keywords other than role differentiators.

item reference is represented by text

Necessity: An item reference must be represented by text that is fully marked.

item reference refers to concept

Necessity: The concept to which an item reference refers must be in the same vocabulary as the concept declared by the glossary entry that contains the explanation of which the item reference is the explanation text.

keyword

Definition: Running explanation text that is not an actual or potential occurrence of a vocabulary-specific concept, but rather expresses a generic logical or linguistic meaning; "small words".

Examples: Articles; pronouns; conjunctions; adverbs; interpunction signs.

Note: Keywords are used to express for example: comparisons, quantifications, conjunctions and oppositions, as well as various aspects of speech organisation such as the use of relative pronouns to refer back to an earlier mention of a concept, the use of a colon to introduce an enumeration, and the use of commas or bulleted list items to separate elements of the enumeration.

noun form

Role in: text evokes noun concept

role differentiator

Definition: Keyword that annotates a text evoking a noun concept involved by a verb concept in a role, and that is used to differentiate that text from other text evoking the same noun concept for a different role in the same verb concept.

Example: "1" and "2" in:

person₁ marries person₂

Necessity: A glossary entry header may contain role differentiators only if it declares a verb concept that involves the same noun concept in multiple roles.

Necessity: An explanation text may contain a role differentiator only if the same role differentiator is also in the glossary entry header for the glossary entry that contains the explanation.

Possibility: A role differentiator may take the form of an integer in subscripted font that immediately follows the text evoking the noun concept that the role is for.

running explanation text is represented by text

text evokes noun concept

Role: The term 'noun form' is used to refer to text in its role of evoking a noun concept.

Example: The text "... customer ..." evokes the noun concept 'customer'.

Example: The text "... Gold Card customers ..." evokes the noun concept 'Gold Card customer'.

Note: Text that evokes a noun concept may appear in singular or plural form, and it may have capitalization that may or may not be part of the concept name of the noun concept.

Note: In the case of text evoking an individual concept, the text is identical to the concept name by which the individual concept was declared.

Note: 'To evoke' in this verb concept is a shortcut. The text is a linguistic variation of a term, and this term *is for* the noun concept.

text evokes verb concept

Role: The term 'verb form' is used to refer to text in its role of *evoking* a verb concept.

Example: The word "rent" in the text "... customers who rent cars ..." evoking the verb concept 'customer rents car'.

Example: The words "is rented by" in the text "... car that is rented by a customer ..." evoking the verb concept 'customer rents car'.

Note: Text that evokes a verb concept may appear in a range of forms, depending on whether it has present or past tense, predicative or attributive use of participles, and other linguistic variations.

Note: 'To evoke' in this verb concept is a shortcut. The text is a linguistic variation, or a logical derivation (e.g. in the case of derived verb concepts), or a combination of both, of a term, and this term *is for* the verb concept.

text is formal

Definition: For each element of the text, the fact that it is marked or not marked is considered to have formal significance.

Necessity: Each text is either *formal* or *free-form*.

Necessity: A glossary entry header is represented by text that is *formal*.

Necessity: An item reference is represented by text that is *formal*.

Necessity: A running explanation text that is a statement text is represented by text that is *formal*.

Necessity: A running explanation text that is a definition text is represented by text that is *formal*.

text is free-form

Definition: For each element of the text, the fact that it is marked or not marked is only considered informative.

Necessity: Each text is either *formal* or *free-form*.

Necessity: The running explanation text of an explanation with label "Example:" is represented by text that is *free-form*.

Necessity: The running explanation text of an explanation with label "Note:" is represented by text that is *free-form*.

Note: *Free-form text* almost always has some unmarked elements but even if it is *fully marked*, that does not make it *formal*.

text is fully marked

Definition: The text contains only text that is marked.

Necessity: A glossary entry header must be fully marked.

Necessity: An item reference must be fully marked.

Necessity: A running explanation text that is a statement text stating a structural rule must be fully marked.

Suggestion: It is suggested that a running explanation text that is a statement text stating an element of guidance is fully marked if it uses only keywords and terms defined in the subject vocabulary.

Suggestion: It is suggested that a running explanation text that is a definition text and that is in a glossary entry for a noun concept is fully marked if it uses only keywords and terms defined in the subject vocabulary.

text₁ is made up of text₂

text is marked

Definition: The text either *marks* a noun form, or a verb form, or a keyword.

Definition: The text has a font color, italic font, or underlying, or a combination of these, to indicate that that text represents a declared concept.

text is partly marked

Definition: The text is made up of text that is marked and of text that is not marked.

Suggestion: It is suggested that a running explanation text that is a definition text and that is in a glossary entry for a verb concept is partly marked such that it only *marks* the noun forms that the verb concept involves in its role(s).

Example: the definition text "The person works for the company" as a definition of 'company employs person'.

Note: In this example, note the use of the definite article for each of the roles to reinforce the notion that the noun concept is "already known" in the sense of "does not require definition here".

Suggestion: It is suggested that a running explanation text for an explanation with label "Role:" is *partly marked* such that it only marks the noun form for the role and the noun forms and verb forms corresponding to the verb concept that involves the role.

text is unmarked

Definition: The text is made up exclusively of text that is not marked.

verb form

Role in: text evokes verb concept

8.4. Visual properties of concept marking

Marking for	Example	Color	Italic	Underline	Brackets
General concept	<u>Customers</u>	green	No	Single	No
Verb concept	<i>has</i>	blue	Yes	No	No
Individual concept	<u>Canada</u>	green	No	Double	No
Keyword	<u>the</u>	red	No	No *	No
Vocabulary reference	[SBVR 1.1]	dark blue	No	No	Yes
Unmarked text	Example	black	No	-	-

* Optionality: dotted underline: the

Concept Marking Rules

Necessity: A noun form that is marked must have general-concept marking if it does not evokes an individual concept.

Necessity: A verb form that is marked must have verb-concept marking.

Necessity: A noun form that is marked must have individual-concept marking if it evokes an individual concept.

Necessity: A keyword that is marked must have keyword marking.

Necessity: A vocabulary tag must have vocabulary-reference marking.

individual-concept marking

Definition: Marking by which a text has a green text color, no italic font, and double underlining.

keyword marking

Definition: Marking by which a text has a red text color and no italic font.

Necessity: Text that has keyword marking must have either no underlining at all or dotted underlining.

Note: Use no underlining by default. Dotted underlining can be useful to distinguish keyword marking from unmarked text in situations where font color is not available.

marking

Definition: A standardised text decoration style.

general-concept marking

Definition: Marking by which a text has a green text color, no italic font, and single underlining.

text has marking

verb-concept marking

Definition: Marking by which a text has a blue text color, italic font style, and no underlining.

vocabulary-reference marking

Definition: Marking by which a text has a dark blue text color, no italic font style, and no underlining, and is enclosed in square brackets.

8.5. Integrity rules

Integrity of Text Marking rule

Necessity: A text may only *be marked* if the concept that it *evokes* is declared by a glossary entry in the same vocabulary document or in a different vocabulary document that has the same terminology namespace.

Based on: Integrity of Text Marking [(2.3)]

Unique Declaration Rule

Necessity: No two glossary entries in the same vocabulary document may *declare* a concept by the same concept name.

Based on: Homonym Avoidance [(2.3)]

Note: A term may not be *declared* twice in the same vocabulary document, even in different clauses.

Note: Each glossary entry header in a vocabulary document must be unique.

8.6. Concept structure rules

Category registration rules

Possibility: A glossary item for a category may contain an explanation with label "**Category of**" referring to the term that is the more general concept.

Possibility: A glossary item for a more general concept may contain an explanation with label "**Category**" for each term that is a category.

Necessity: Each explanation with label "**Category**" or "**Category of**" must be an item reference referring to a term for a noun concept declared in the same vocabulary document.

Note: Explanations with labels "**Category**" and "**Category of**" are clarifications only. It is not necessary to use them each time a concept is a category of another concept.

Note: It is preferred that glossary entries that contain an explanation with label "**Category of**" also contain an explanation with label "**Definition**" and a [definition text](#) that mentions the more general concept and the discriminating characteristics that set instances of the category apart from instances of the more general concept.

Example: It is preferred that a glossary entry for "[car](#)" with explanation "Category of: [vehicle](#)", also contains a [definition text](#) like "A four-wheel motorised [vehicle](#) primarily used for the transport of persons".

Role registration rules

Suggestion: An [explanation](#) that identifies a [role](#) is correctly worded by using the label "**Role**" and the [explanation text](#): "The term ... (general concept) is used to refer to a (the same general concept) in its role of (the relevant noun concept involved in the verb concept) (a formulation that uses the verb concept wording, and wording for other relevant verb concept roles, if any)". Alternatively, less elaborate wording may be chosen for readability.

Examples:

(1) "Role: The term [pick-up time](#) is used to refer to a [date/time](#) in its role as the [date/time](#) *when* a [person](#) *picks up* a [rental car](#)."

(2) "Role: The term [pick-up time](#) is used to refer to the [date/time](#) *when* a [person](#) *picks up* a [rental car](#)."

(3) "Role: A [pick-up time](#) is a [date/time](#) *when* a [person](#) *picks up* a [rental car](#)."

each as a possible explanation in the glossary entry for '[person picks up rental car at date/time](#)'.

These explanations are *partly marked*: only the noun forms for the role, the noun forms for the noun concepts involved in the verb concept, and the verb form for the verb concept are marked.

Suggestion: In glossary entries for noun concepts that are [roles](#), it is convenient to add an explanation with label "**Role in**" and the concept name of the verb concept involving the role, as follows:

Example:

"Role in: [person picks up rental car at date/time](#)"

as an explanation in the glossary entry for '[pick-up time](#)'.

Necessity: Each explanation with label "**Role**" must be [running explanation text](#) that is *partly marked* and that contains noun forms for the role and for the noun concepts involved in the verb concept as well as one or more verb forms for the verb concept.

Necessity: Each explanation with label "**Role in**" must be an [item reference referring to](#) the [verb concept](#)

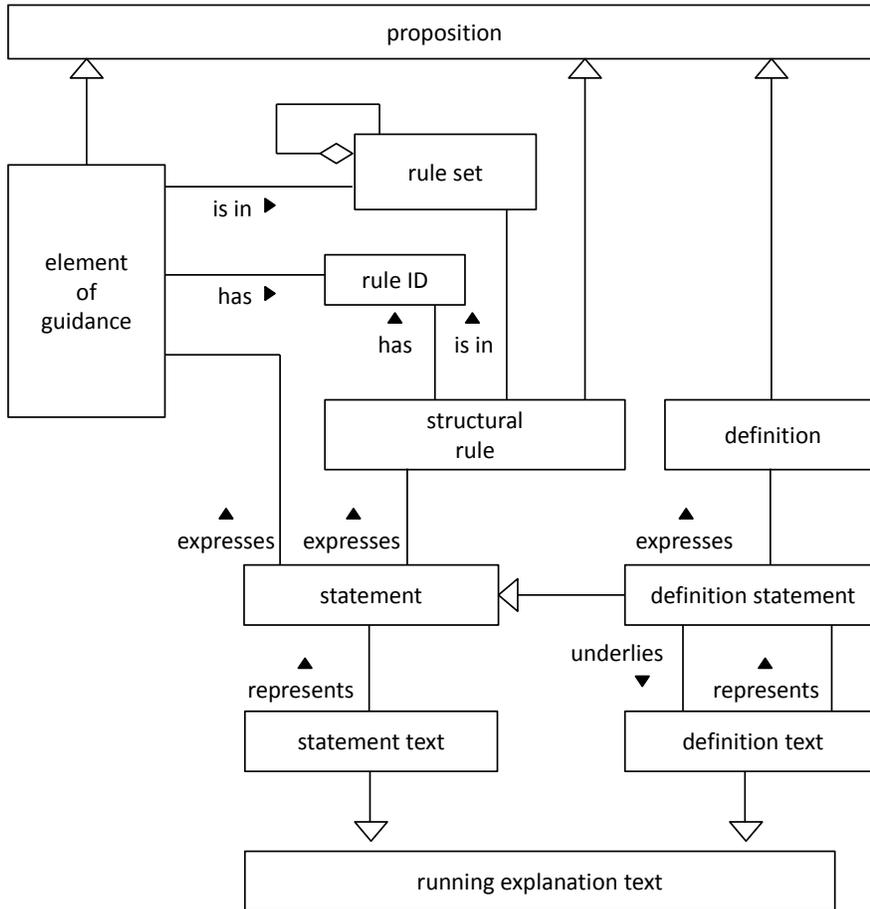
that *has* the role.

Synonym registration rules

- Necessity: A glossary item for a [synonym](#) must contain an explanation with label "**Synonym**", "**Synonymous form**" or "**See**" referring to the term that it *is synonym of*.
- Necessity: The label "**Synonym**" may only be used in glossary entries for [noun concepts](#).
- Necessity: The label "**Synonymous form**" may only be used in glossary entries for [verb concepts](#).
- Necessity: Each explanation with label "**Synonym**", "**Synonymous form**" or "**See**" must be an [item reference](#) referring to a [term](#) for a [concept declared in](#) the same [vocabulary document](#).
- Necessity: A glossary entry for a term referred to by an explanation with label "**Synonym**", "**Synonymous form**" or "**See**" must itself contain an explanation with label "**Synonym**", "**Synonymous form**" or "**See**" that refers to the term that the glossary entry of the first explanation is for.
- Suggestion: It is suggested that labels "**Synonym**" and "**Synonymous form**" are used only in glossary entries for [preferred synonyms](#).
- Suggestion: It is suggested that label "**See**" is used only in glossary entries for [synonyms](#) that are **not** [preferred synonyms](#).
- Possibility: The label "**Synonymous form**" may be abbreviated to "**Syn. form**".

9. Statements

9.1. Statements in the document



definition statement

See: [definition statement](#) *underlies* [definition text](#)

Category of: [statement](#)

definition statement *expresses* [definition](#)

Derived from: [statement](#) *expresses* [proposition](#)

definition statement *underlies* [definition text](#)

Definition: The [definition statement](#) is the full grammatical sentence that is semantically equivalent to the [definition text](#) in the context of the glossary entry where that definition text is found.

Example: The definition statement underlying a definition text "A passenger who is over 65 years old." in a glossary item for the concept name "senior passenger" is:

"A senior passenger is a passenger who is over 65 years old."

Note: The definition statement underlying a definition text is found by combining the term declared by the glossary entry that contains the definition text, the copula "is", and the definition text itself.

definition text represents definition statement

definition text is for definition

Definition: The definition text represents a definition statement that expresses the definition.

element of guidance has rule ID

Contingency: An element of guidance may or may not *have* a rule ID.

element of guidance is in rule set

Contingency: An element of guidance may or may not *be in* a rule set.

rule ID

Definition: A short code or number, or a name, that uniquely identifies a proposition in a vocabulary.

Example: VCZ-2204

Example: Minimum Driver Age Rule

Note: "Rule" in "rule ID" is used loosely. Rule IDs may *be of* structural rules and business rules but also *of* business policies and advices.

rule set

Definition: A set of propositions that belong together logically because they cover the same subject area.

Note: For document organisation reasons, rules *contained in* a glossary entry for a concept *are never also in* a rule set.

rule set₁ includes rule set₂

Definition: The propositions that *are in* rule set₂ *are* a subset of the propositions that *are in* rule set₁.

statement

Definition: A text expressing a proposition or a text that is a definition statement.

Based on: [SBVR 1.1](#) ['statement']

Note: In [SBVR 1.1] the term 'statement' is not used for text that is a definition statement.

statement expresses proposition

Source: [SBVR 1.1](#) ['statement expresses proposition']

statement expresses element of guidance

Derived from: [statement expresses proposition](#)

statement expresses structural rule

Derived from: [statement expresses proposition](#)

statement text represents statement

statement text is for element of guidance

Definition: The [statement text](#) represents a statement that expresses the [element of guidance](#).

statement text is for structural rule

Definition: The [statement text](#) represents a statement that expresses the [structural rule](#).

structural rule has rule ID

Contingency: A [structural rule](#) may or may not *have* a [rule ID](#).

structural rule is in rule set

Contingency: A [structural rule](#) may or may not *be in* a [rule set](#).

9.2. Rules for definitions

Rules for registering definitions

Concept type: [rule set](#) [SBVR-SE]

Necessity: A [definition](#) *must be stated by* a [definition text](#).

Necessity: Each [explanation](#) that *is a* [definition text](#) *must have the label* "Definition:".

Necessity: A definition text stating the definition of a verbal concept must have markings only for the general concepts involved in the verbal concept.

Example: The definition for the concept '[individual client presents credit card](#)' may be

formulated and marked as follows:

"The individual client uses the credit card ID of the credit card as a means of payment or submits the credit card to an EU-Rent official with the purpose of letting this official use the credit card ID of the credit card as a means of payment."

Possibility: A concept may have multiple definitions.

Possibility: A concept may be declared by a glossary entry but not have any definitions.

Necessity: A definition text that is semantically equivalent to a structural rule must be fully marked.

9.3. The best place for "rules"

Definitions always pertain to a specific concept that they define. In a vocabulary document, their natural place is in the glossary entry that declares that concept. Likewise, rules that relate completely, or mainly, to a single concept are best stated in the glossary entry for that concept. A typical example is cardinality rules for verb concepts:

manager signs contract

Necessity: Each contract must be *signed by at least* two managers.

Finding the best place in a vocabulary document to register *rules* and *elements of guidance* that relate to multiple concepts is a much greater challenge. It is not attractive to repeat the rule in each place where one of those concepts is declared, because single-point-of-definition is lost in this way.

On the other hand, it is still desirable to express rules in the type of labeled explanation texts also used for other specifications, because this makes it easier to recognise them as formal specifications and also to make the vocabulary document suitable for machine-processed interpretation.

A good approach to registering rules that do not clearly belong to a single glossary entry is to subsume the rules under glossary entries made especially for them. In many organizations, rules have a rule code or ID such as "AWZ-2203". Such codes may be declared as (individual) concepts in their own right, as in the following example:

AV-001

Business rule: At a given branch and a given date/time, a booking threshold of at least 10% of the cars expected to be located at the branch and at the date/time must be kept for walk-in rentals.

Rule set: Availability rules

AV-002

Business rule: *A car is only available to a rental request if it is not reserved for an existing rental during all or part of the requested rental period.*

Rule set: Availability rules

Rules may also be organised by subject fields in *rule sets*. The rule set name is the declared concept:

Availability rules

Concept type: rule set [SBVR].

Business rule: *At a given branch and a given date/time, a booking threshold of at least 10% of the cars expected to be located at the branch and at the date/time must be kept for walk-in rentals.*

Business rule: *A car is only available to a rental request if it is not reserved for an existing rental during all or part of the requested rental period.*

In a vocabulary document you can include *business policies* that rules or advices are based on. Sometimes it is helpful to include an occasional policy statement. More often, including business policies is a fundamental choice: a document that include business policies will often strive to motivate most, if not all, of the elements of guidance it contains. What works well is to group rules motivated by the same policy in the same rule set:

End user price transparency

Policy: End users must be able to find out how each EU-Rent price is determined.

Necessity: *The individual price components that make up the quoted price of each rental request must be specified to the customer.*

Necessity: *A rental contract form must specify all discounts applied to the agreed price.*

Rules for registering rules

Necessity: *Each business rule must be stated by an explanation text.*

Necessity: *Each structural rule must be stated by an explanation text.*

Necessity: *An explanation that is a structural rule must have the label "Necessity:".*

Necessity: *An explanation that is a business rule must have the label "Necessity:".*

Necessity: *A statement text for a structural rule must be fully marked.*

Necessity: *It is desirable that a statement text for a business rule is fully marked.*

Possibility: A rule that pertains fully or mostly to a concept may be stated in an explanation in the glossary entry of that concept.

Possibility: A rule that does not pertain fully or mostly to a single concept may be included in a glossary entry for a rule set or a rule ID.

Rules for level of enforcement

- Possibility: The level of enforcement of a business rule may be expressed by starting the statement with an impersonal verb such as "it is desirable that...", "It is suggested that...".
- Possibility: A low level of enforcement of a business rule may be expressed by selecting the label "Suggestion:" for the explanation that is the business rule.

Rules for registering advices

- Necessity: Each advice must be stated by an explanation text.
- Necessity: Each explanation that is an advice must have the label "Possibility:".
- Possibility: An element of guidance that pertains fully or mostly to a concept may be stated in an explanation in the glossary entry of that concept.
- Possibility: An element of guidance that does not pertain fully or mostly to a single concept may be included in a glossary entry for a rule set or a rule ID.

Rules for registering business policies

- Necessity: Each business policy must be stated by an explanation text.
- Necessity: Each explanation that is a business policy must have the label "Necessity:" or the label "Policy:".
- Possibility: Elements of guidance may be grouped in a rule set that maps to the business policy that is the basis for those elements of guidance.
- Possibility: A glossary item for an element of guidance may contain an explanation with label "**Based on:**" that refers to the business policy that is the basis for that element of guidance.
- Note: Grouping rules by business policies in a (named) rule set is often the more successful approach.
- Note: To tell business policies apart from business rules, the use of the "Policy:" label is essential. On the other hand, the difference between the two is one of degree, rather than of kind. You may want to use the "**Necessity:**" label for business policies to prevent unnecessary discussions of categorization.

Rules for registering other types of statement

- Possibility: An explanation of which the explanation text states a contingency may have the label "Note:".
- Possibility: An explanation of which the explanation text states a option may have the label "Note:".
- Possibility: An explanation of which the explanation text states a suggestion may have the label "Note:".

9.4. Statement form

Statement type	Modal form	Example	Label
Definition	Fact-form	A passenger who is over 65 years old. (as a definition of 'senior passenger')	Definition:
Structural rule	Fact-form	A labour contract is either a fixed contract or a temporary contract but not both.	Necessity:
Business rule	Rule-form	A renter must be offered an upgrade if a car from the requested category is not available.	Necessity:
Business policy	Rule-form	Price components of rental prices must be made transparent to customers.	Necessity: Policy:

Possibility	Advice-form	It is possible that the destination branch has limited storage capacity.	Possibility:
Contingency	Advice-form	The machine may or may not return change.	Possibility: Note:
Permission	Advice-form	Customers may submit rental requests until 22.00 hours.	Possibility:
Optionality	Advice-form	Local customers do not need to specify an IBAN number.	Possibility: Note:

Suggestion	(any)	It is helpful to specify the parking lot number on the request form if it is available.	Necessity: Suggestion: Note:
Other	(any)	(any)	Note:

modal expression of necessity

Definition: Each of the following:

- "must"
- The combination of "may" and "not"
- The combination of "may" and "only"
- "it is necessary that", "it is obligatory that"

Note: There is no reason to use other forms but there are many forms that are synonymous. For example, "it is mandatory that" is a synonym of "it is obligatory that", and "No driver may..." is synonymous of "A driver may not ..."

modal expression of possibility

Definition: Each of the following:

- "may", except in combination with "not" or "only"
- "may or may not"
- "it is possible that", "it is permitted that"
- "it is not necessary that", "it is not obligatory that"
- "do not need to", "does not need to"

Note: There is no reason to use other forms but there are many forms that are synonymous.

Rules for statement form

Necessity: A definition statement *has fact-form*.

Example: "A senior passenger **is** a passenger who is over 65 years old."

Necessity: A statement that *expresses an advice* *must have advice-form*.

Example: "Customers **may** submit rental requests until 22.00 hours."

Necessity: A statement that *expresses a business policy* *must have rule-form*.

Example: "Price components of rental prices **must** be made transparent to customers."

Necessity: A statement that *expresses a business rule* *must have rule-form*.

Example: "A renter **must** be offered an upgrade if a car from the requested category is not available."

Necessity: A statement that *expresses a structural rule* *must have fact-form*.

Example: "A senior passenger **is** a passenger who is over 65 years old."

Example: "A labour contract **is** either a fixed contract or a temporary contract but not both."

statement has advice-form

Definition: The main clause of the statement contains a modal expression of possibility.

Note: The grammatical analysis of sentences is beyond the scope of this specification. Mostly, statements expressing definitions, rules or advices are composed of a single grammatical sentence, and most such sentences have a single main clause with a single main verb. A sentence may contain any number of other clauses (termed *subordinate clauses*), each with their own verb or verbs.

statement *has fact-form*

Definition: The main clause of the statement contains neither a modal expression of necessity nor a modal expression of possibility.

Note: The grammatical analysis of sentences is beyond the scope of this specification. Mostly, statements expressing definitions, rules or advices are composed of a single grammatical sentence, and most such sentences have a single main clause with a single main verb. A sentence may contain any number of other clauses (termed *subordinate clauses*), each with their own verb or verbs.

statement *has rule-form*

Definition: The main clause of the statement contains a modal expression of necessity.

Note: The grammatical analysis of sentences is beyond the scope of this specification. Mostly, statements expressing definitions, rules or advices are composed of a single grammatical sentence, and most such sentences have a single main clause with a single main verb. A sentence may contain any number of other clauses (termed *subordinate clauses*), each with their own verb or verbs.

10. Vocabularies in the document

service depot

This is a **original** term.

Definition: Rental organization that is responsible for maintenance and servicing of rental cars

Reference scheme: The name of the locality that the service depot is at.

service depot

This is an **adopted** term.
It is adopted from "EU-Rent 4.2".

Source: EU-Rent 4.2

service depot

This is an **adopted** term.
It is adopted from "EU-Rent 4.2", where a different term is used with the same meaning ("service point")

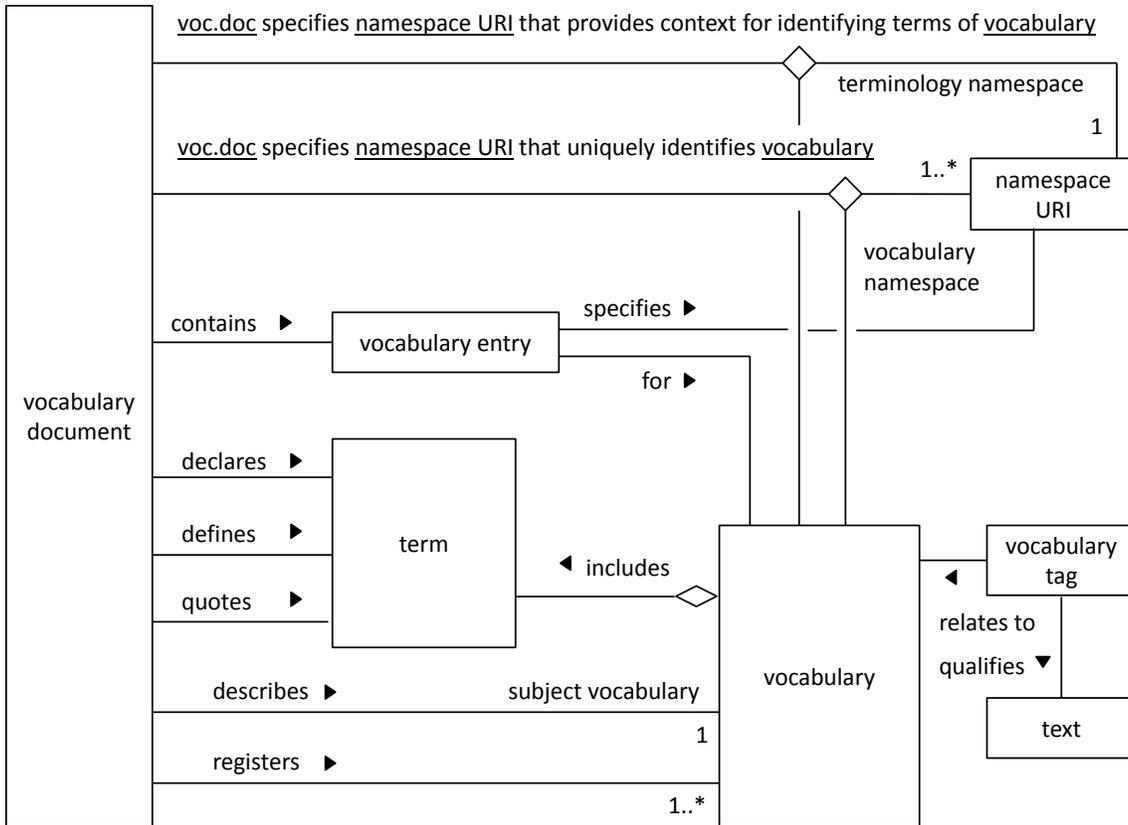
Source: EU-Rent 4.2 ['service point']

service depot

This is a **quoted** term.
It is not adopted. It is not made a part of the subject vocabulary of the document that contains the text quoted here.

Definition: Rental organization that is responsible for maintenance and servicing of rental cars

Note: Service depot is different from 'maintenance point' [EU-Rent (4.2)], which is an EU-Rent site.



subject vocabulary

Role in: vocabulary document *describes* vocabulary

vocabulary document *contains* vocabulary entry

Note: It is helpful to group vocabulary entries in a clause of their own near the top of the vocabulary document.

vocabulary document *declares* term

Definition: The vocabulary document *contains* a glossary entry that *declares* a concept by the concept name that *identifies* the term.

Necessity: A glossary entry by which a vocabulary document *declares* an original term may not *contain* an explanation with label "Source".

Necessity: A glossary entry by which a vocabulary document *declares* an adopted term must *contain* exactly one explanation with label "Source".

Necessity: Each explanation with label "Source" must be an item reference referring to a vocabulary registered in the same vocabulary document.

vocabulary document defines term

Definition: The vocabulary document contains a glossary entry that *declares* a concept by the concept name that *identifies* the term, and this glossary entry includes an explanation with label "Definition:" and *with* an explanation text that *is* a definition of the concept.

vocabulary document quotes term

Definition: The term is not *declared in the* vocabulary document and the vocabulary document contains one or more explanation texts that mention the term for purposes of discussion or comparison.

Necessity: Text that refers to a quoted term may not *be marked*.

Necessity: A quoted term must be surrounded by single quotes.

Possibility: A quoted term may *be qualified by* a vocabulary tag *identifying* the vocabulary that *includes* the term.

Example: ... 'rental contract' [EU-Rent 1.0] ...

vocabulary document registers vocabulary

Definition: The vocabulary document contains a vocabulary entry for the vocabulary.

Note: A vocabulary document registers a vocabulary, along with its name and other information about it such as an abbreviation, namespace URI, description, etc. with the purpose of documenting its existence and being able to refer to it, for example as a source of adopted terms, or to clarify relationships between the vocabulary and the vocabulary document's subject vocabulary.

Necessity: A vocabulary document must *register* the vocabulary that it *describes*.

vocabulary document specifies namespace URI that provides context for identifying terms of vocabulary

Based on: Homonym Avoidance [(2.3)]

Based on: Terminology Reference Scheme [(2.3)]

Definition: The vocabulary document contains a vocabulary entry that specifies the namespace URI and the namespace URI is suitable for referring uniquely to the terms of the vocabulary.

Role: The term 'terminology namespace' is used to refer to a namespace URI in its role of namespace URI specified by a vocabulary document and that *provides context for identifying terms of* a vocabulary.

Necessity: Each vocabulary document must *specify exactly one* terminology namespace.

Necessity: A terminology namespace *provides context for identifying terms of* its vocabulary document's subject vocabulary.

Necessity: A terminology namespace must *be the* vocabulary namespace of the top-level vocabulary of its vocabulary document's subject vocabulary.

Necessity: A terminology namespace may only *be specified in the first* vocabulary entry in document order

of its [vocabulary document](#).

Note: On the choice of modelling this as a ternary verb concept, see Annex C, "Notes on ternary and n-ary verb concepts".

vocabulary document specifies namespace URI that uniquely identifies vocabulary

Definition: The [vocabulary document](#) contains a vocabulary entry that is for the [vocabulary](#) and that specifies the [namespace URI](#).

Role: The term '[vocabulary namespace](#)' is used to refer to a [namespace URI](#) in its role of [namespace URI specified by a vocabulary document](#) and that *uniquely identifies* a [vocabulary](#).

Possibility: *A [vocabulary document](#) may specify a [vocabulary namespace](#) for each of the [vocabularies](#) that it registers.*

Note: On the choice of modelling this as a ternary verb concept, see Annex C, "Notes on ternary and n-ary verb concepts".

vocabulary entry

Definition: *A [glossary entry](#) that declares a [vocabulary](#).*

Possibility: *A [vocabulary entry](#) may contain [explanations](#) that explain how [vocabularies](#) include each other.*

Possibility: *A [vocabulary entry](#) may contain [explanations](#) that explain how specific sections or clauses of the [vocabulary document](#) correspond to various [included vocabularies](#).*

Possibility: *A [vocabulary entry](#) may contain [explanations](#) that explain how [vocabularies](#) adopt concepts from each other.*

Note: It is helpful to create short-form synonyms of vocabulary names, such as "SBVR 1.1" for "Semantics of Business Vocabulary and Rules 1.1", that can be used conveniently in [vocabulary tags](#).

vocabulary entry is for vocabulary

Definition: *The [vocabulary](#) is declared by the [vocabulary entry](#).*

vocabulary entry specifies namespace URI

Definition: The [vocabulary entry](#) contains an explanation with label "Namespace URI:" and with an explanation text that is the [namespace URI](#).

Necessity: *Each [vocabulary entry](#) must specify exactly one [namespace URI](#).*

vocabulary tag

Definition: *Text* that refers to a specific [vocabulary](#) and that contributes to identifying the source of a [concept](#)

Necessity: A vocabulary tag must either qualify an item reference that refers to a vocabulary (Example 1

below) or it must itself contain the name of a vocabulary (Examples 2 and 3 below).

Possibility: A vocabulary tag may or may not specify the version of the vocabulary referred to.

Possibility: A vocabulary reference may specify the clause (such as "8.3") or other document location (such as "Appendix A" of the vocabulary document referred to.

Possibility: A vocabulary may refer to a concept name in the vocabulary referred to by single-quoting this name.

Possibility: A vocabulary tag may immediately precede, or immediately follow the [text](#) that it *qualifies*. When preceding it, a colon at the end of the text in the vocabulary tag may be helpful to the reader.

Example 1: " [EU-Rent 1.0](#) ['car maintenance'] "

Example 2: " [EU-Rent 1.0:] " in: " [EU-Rent 1.0:] [car maintenance](#) "

Example 3: " [EU-Rent 1.0 (8.3)] " in: " [car maintenance](#) [EU-Rent 1.0 (8.3)] "

[vocabulary tag qualifies text](#)

Definition: The [vocabulary tag](#) relates to the [text](#) by being placed immediately before or after it.

[vocabulary tag relates to vocabulary](#)

Definition: Either the [vocabulary tag](#) qualifies an item reference that refers to the [vocabulary](#), or it contains itself a name that identifies the [vocabulary](#).

Annex A. Implicitly available forms

Noun form variants

When you have this concept feel free to color-code text like this:
customer	... customers ...
customer	Customers ...

Verb form variants

When you have this concept feel free to color-code text like this:
rental <i>is fully paid</i>	Rentals must <i>be fully paid</i> before ...
rental <i>is fully paid</i>	<i>Fully-paid</i> rentals ...
person <i>rents car</i>	Cars may not <i>be rented by</i> persons who ...
person <i>rents car</i>	... <i>rented</i> cars ...
person <i>rents car</i>	... persons <i>renting</i> cars ...

Possession, relationship

When you have this concept feel free to color-code text like this:
<u>person</u> <i>has</i> <u>first name</u>	... the <u>first name</u> <i>of</i> each <u>person</u> who ...
<u>person</u> <i>has</i> <u>first name</u>	... each <u>person's</u> <u>first name</u> ...
<u>person</u> <i>has</i> <u>first name</u>	... <u>persons</u> <i>with</i> a <u>first name</u> starting ...
<u>person</u> <i>has</i> <u>first name</u>	... a <u>person</u> must ... <i>his or her</i> <u>first name</u> starts with ...
<u>person</u> <i>has</i> <u>first name</u>	... <u>persons</u> <i>whose</i> <u>first name</u> starts with ...
<u>contract</u> <i>has</i> <u>contract name</u>	... a <u>contract</u> <i>of which</i> the <u>contract date</u> ...

Roles

When you have this concept feel free to color-code text like this:
<u>company</u> <i>employs</i> <u>person</u> with role: <u>employer</u>	... if a <u>person</u> <i>have</i> an <u>employer</u> the <u>employer</u> <i>of</i> each <u>person</u> who a <u>person</u> must ... his or her <u>employer</u> ...
<u>company</u> <i>employs</i> <u>person</u> with role: <u>employee</u>	... if <u>companies</u> <i>have</i> <u>employees</u> each <u>employee</u> <i>of</i> a <u>company</u> that a <u>company</u> must ... its <u>employees</u> ...

Derived verb concepts

When you have this concept feel free to color-code text like this:
<u>location</u> <i>has</i> <u>address</u> with category: <u>point of sale</u>	... <u>points of sale</u> must <i>have</i> an <u>address</u> that the <u>address</u> <i>of</i> the <u>point of sale</u> where ...

Partitive verb concepts

When you have this concept feel free to color-code text like this:
<u>local area</u> <i>includes</i> <u>branch</u> <u>local area</u> <i>contains</i> <u>branch</u>	... <u>local areas</u> that <i>have</i> <u>branches</u> <u>branches</u> <i>of</i> <u>local areas</u> the <u>local area's</u> <u>branches</u> a <u>local area</u> <i>with</i> <u>branches</u> in <u>branches</u> <i>in</i> <u>local areas</u> ...
<u>car</u> <i>is made up of</i> <u>part</u>	... <u>cars</u> that <i>have</i> <u>parts</u> the <u>parts</u> <i>of</i> that <u>car</u> the <u>car's</u> <u>parts</u> ...

Conjunctions and prepositions of time and place

When you have this concept feel free to color-code text like this:
<u>customer</u> <i>picks up</i> <u>car</u> <i>at</i> <u>date/time</u>	... the <u>date/time</u> <i>when</i> a <u>customer</u> ...

customer *picks up* car *at* branch

... the branch *where* a customer ...

"Shortcut" relationships

In natural language, it is often practical to introduce "shortcut" connections between objects that are already connected by nominalizations, binary fact types with a 1:1 cardinality, or a combination of both. You can consider such derived fact types as implicitly available forms. For simplification, omit them from glossaries and diagrams. Use them in rule formulations to make the rule shorter and easier to grasp. Use a neutral verb concept such as *has/of, is of, is for*:

When you have this concept feel free to color-code text like this:
<p><u>customer</u> <i>picks up</i> <u>car</u> <i>at</i> <u>date/time</u> with nominalization: <u>rental option</u> = <u>car</u> <i>is available to</i> <u>rental request</u></p>	<p>... a <u>rental option</u> (that is) <i>for</i> a <u>rental car</u> <i>available to</i> the <u>rental request</u> ...</p>
<p><u>rental</u> <i>is based on</i> <u>rental agreement</u> with nominalization: <u>rental agreement</u> = <u>client</u> <i>agrees to</i> <u>rental proposition</u> <i>made by</i> <u>EU-Rent</u></p>	<p>... the <u>rental proposition</u> <i>of</i> the <u>rental</u> ...</p>

"To be" as an independent verb

When the verb "to be" is used independently with the meaning "is identical to" or "belongs to the category of", its forms may be given verb-concept marking (*is, are, be*) even if no corresponding verb concept has been declared: *is* in:

... *if* the identification *presented by* the passenger *is* a valid ID card, ...

Annex B. Keyword marking

The practical purpose of keyword marking is not so much to signal "grammatical words", but to:

- Draw attention to words in black font that are *potentially* noun forms or verb forms. Keyword marking helps these words stand out.
- Give the message that an entire statement is intended as *fully marked*, by marking in red all the words that are not noun forms or verb forms. In this case, all interpunction symbols are also marked red.

In theory, there is one set of words that are always ("red") keywords, and another set of words that are potentially ("green" or "blue") noun forms or verb forms. In practice, certain words cross over from set to the other.

Articles, particles that express logical operations or comparisons, modal auxiliaries, conjunctions and personal and relative pronouns can only have keyword marking (if they are marked at all):

If marked, always keyword marking (examples):				
a(n)	and	that	must	it is possible that
the	but	who	may	it is necessary that
not	or	whom	have to	it is suggested that
greater	either	which	can	able to
smaller	whether	if	cannot	allowed to
higher	any	when	before	he
lower	all	unless	after	she
earlier	each	except when	a given	they
later	no	while	other	it
more	none	else	another	them
less	does not	same		
than	do not	different		

Many larger phrases that are set expressions are also suitable for all-keyword marking:

must be considered	as a means of
with the purpose of	in order to

But a relative or possessive pronoun following a preposition may be marked as a verb form, as in:

<i>by which</i>	<i>in which</i>	<i>of which</i>	<i>during which</i>	<i>the <u>date/time</u> at which</i>
<i>for whom</i>	<i>to whom</i>	<i>whose</i>	<i>the <u>date/time</u> at which</i>	<i>the <u>date/time</u> when</i>

It is logical to think that personal pronouns "stand in" for noun concepts mentioned earlier, and therefore should get noun concept marking, but common practice is to use keyword marking instead:

... a local area must notify ... before it ...

(it, not it – and likewise: he, she, they)

The same is true of possessive adjectives:

... a local area must notify ... before its branches ...

(its, not its, if when you have a verb concept local area has branches).

Much less is "its" analysed into a pronominal component "it-" and a possessive "-s": not: its. A given word always has a single color, except for words with the genitive ending "'s":

... a local area's branches ...

Numerals, numerals in combination with standard units of measurement, and quantities or amounts of something declared as a noun concept always get individual-concept marking:

<u>200</u>	<u>two hundred</u>
<u>20 cm</u>	<u>€ 200</u>
<u>four wheels</u> (if you have: <u>wheel</u>)	

Annex C. Notes on ternary and n-ary verb concepts

The primacy of events

Business vocabularies describe or capture, in natural language, how a business operates. Some modelling techniques are explicitly *event-based*. Process modelling focuses on logistic events such as sending and receiving messages, signing contracts and delivering products. Decision modelling and transaction modelling have a slightly different slant by centering on problem solving and on negotiation patterns, respectively. What these approaches have in common is that they focus on time-dependent and place-dependent *events* and *actions*.

By contrast, SBVR is sometimes mistaken for a static, fact-based, or even data-centered modelling technique. SBVR itself points out that it does not preclude event-based modelling, informatively in a special section A.6.5 on "State", and more formally at the end of the introduction to Clause 9. However, SBVR's point of departure is essentially a *linguistic* one: it seeks to act on how business people actually make sense of their own business's operation by formulating in language statements what goes on, "how things are done".

The truth is that business activity is always primarily event-centered, independently of the modelling technique used to describe, understand and design it. It is by focusing on *business language* that SBVR seems to replace this event-based perspective by a more static view. Three mechanisms concur to produce this effect: nominalization, sedimentation in business data, and externalisation of history of production.

Nominalization is a linguistic strategy that consists of capturing the various aspects of an event in a single word. This makes it possible to express complex truths about events in simple sentences. Instead of having to say "the fact that a customer has agreed to the terms of a rental proposition" the speaker can simply use the word "rental" in a statement such as "A rental may only be cancelled...". The noun form and also the combination with the article "a" make it seem as though "rental" is a static thing. In reality, much more than nouns such as "person" and "country", "rental" strongly implies an event-based context.

Sedimentation in business data is the phenomenon that businesses need to keep detailed records of commitments, payments and orders in an information system. Business events leave behind them a trail of such

data. Traditionally, business modelling was essentially data modelling: it focused on how to represent business data in IT systems. Business vocabularies in the sense of SBVR look beyond this recording process to the primary business events, even though information systems are an integral part of what is modelled. In a language such as English, it is easy to confound these two aspects in words like "booking" or "request", which sometimes nominalize the primary business action ("the booking of a flight") and other times represent the sedimentation in data ("a flight booking" meaning the record that a customer agreed to a flight proposition and has committed to paying the quoted price).

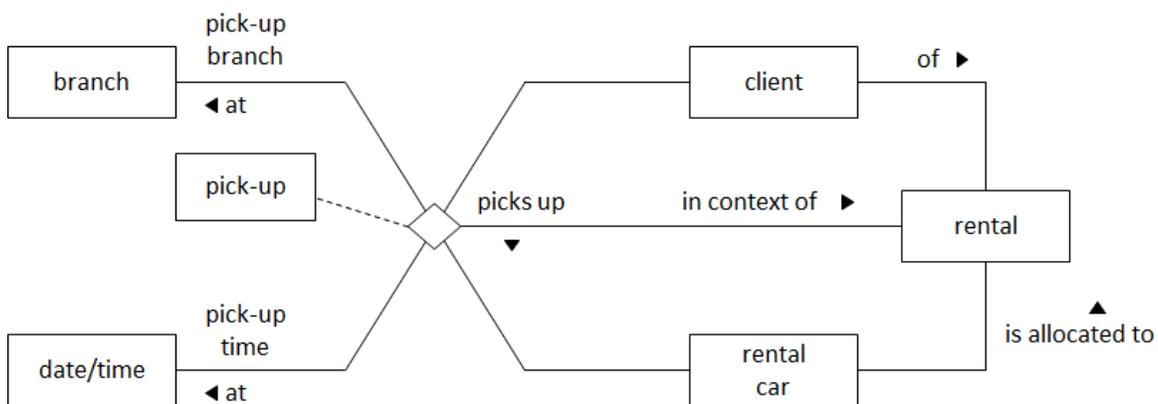
Externalisation of history of production occurs when a business vocabulary is interested only in the *result* of some business event that happens (or happened in the past) outside its universe of discourse. A customer name seems a typical example of "static data", but it is the result of an event that once occurred: the historic event that a customer's ancestor was given the name.

The anatomy of a business event

At the heart of SBVR-type modelling, then, is the implied but disguised primacy of business events. In addition to referring to an event indirectly by nominalization, data sedimentation or externalisation of history of production, an SBVR modeller can model events and actions explicitly. This results in a ternary or n-ary fact type because most business events and actions have a number of aspects of interest that exceeds the number two:

- The person or organisation performing the action,
- The person or organisation affected by the event, or to whom the action is directed,
- The time when the action or event occurs,
- The place where the action or event occurs,
- The object, product, service, instrument, amount ... involved in the event or action.

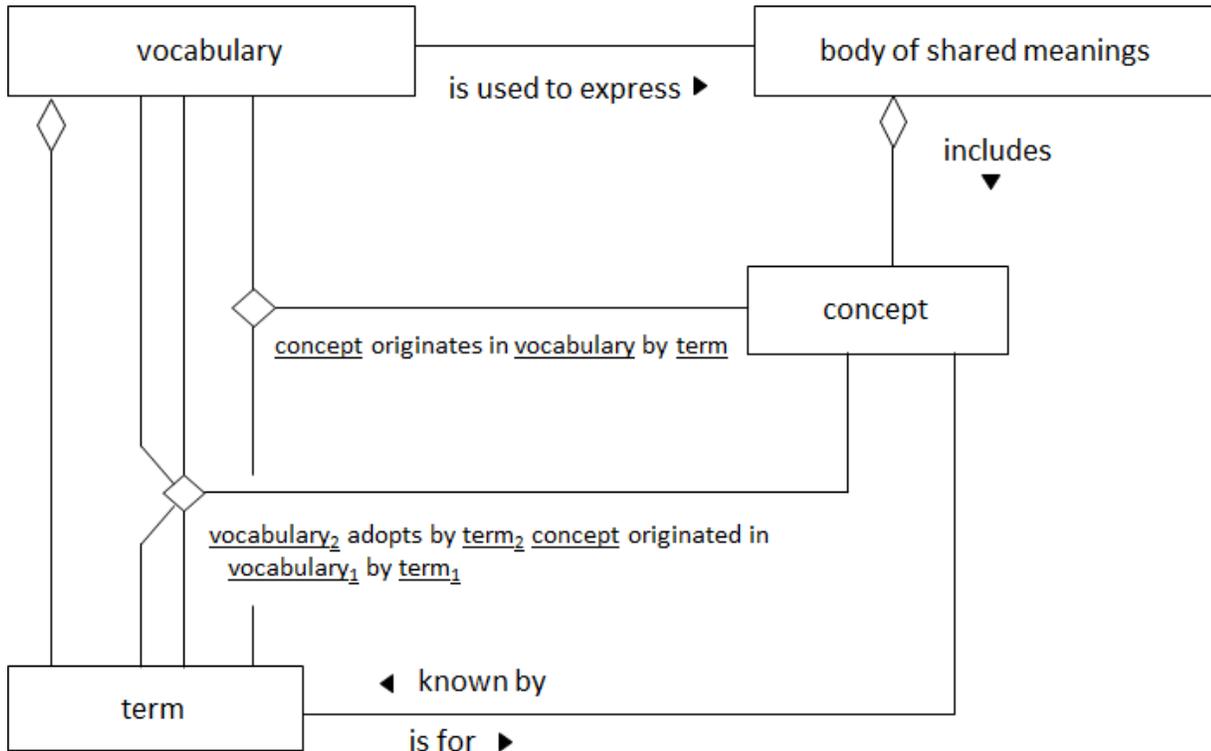
An example in a car rental company is the event type of a rental car being picked-up, nominalized by the word "pick-up":



The main body of this document uses ternary and n-ary fact types very sparingly. The main reason for this is that this vocabulary does not cover business activity. Rather, it covers a meta-model (a simplification of the SBVR meta-model) and a design for a document format. Both these subjects may be described in static terms. The

document format, for example, describes the various document elements and their structure "after the fact" – the event of actually writing the document is externalised.

In Section 3, the process of adopting terms from a different vocabulary is nominalized. This results in a concept diagram with only binary and unary fact types. An alternative option would have been to address a speech community's action of creating and adopting terms more explicitly, using a ternary and an n-ary fact type:



In this diagram, the binary fact types 'body of shared meanings includes concept', 'vocabulary includes term' and 'concept is known by term' are *facta*: results of business events. These founder events are represented by the "diamonds". This analysis allows more insight than the static, nominalized model in Section 3. Regarding the coining of terms, it makes explicit that concepts may only be included in vocabularies through the introduction of terms that designate them. This in turn illuminates the structure of adoption: while this is a type of 'copy', the adopting community must always take on a combination of term and concept; as part of the adoption they can choose a different term, but not a different concept. The rationale for modelling Section 3 not like this but in a more static way was that the adoption process is externalised: it happens outside the scope of the specification, which covers only the resulting document format.

In Section 10, the same rationale could be applied to the ternary fact types for namespace URI specification. They really cover a static reality after-the-fact (which was never a business activity to start with; the verb 'specify' hints that it is merely a choice of data representation), so they could easily have been replaced by binary fact types. The choice of a ternary fact type here is not more than a matter of style. In this case, it draws attention to identification. The combination vocabulary document – vocabulary – namespace URI can meaningfully be viewed as a composite primary key that cannot be normalised into a less-than-ternary key. This

primary key is very important in the specification, because it determines the reference scheme for business terminology. The document must have a single terminology namespace, which is the namespace URI string, which in turn designates the vocabulary that is described by the document, all on a 1:1 basis. The same design choice motivates "[glossary entry declares concept by concept name](#)" in Section 8.

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