SBVR and Business Ontology:

How "Semantics of Business Vocabulary & Business Rules" adds Knowledge Richness to ISO TC 37 Terminology Standards to Create Terminological Ontologies

Donald Chapin

**Co-chair OMG Business Modeling & Integration Domain Task Force
OMG Liaison to ISO TC 37 and its Subcommittees
Co-chair OMG SBVR Revision Task Force
ISO TC 37/SC 1/WG 5 Project Leader for SBVR**

Business Semantics Ltd.

Donald.Chapin@BusinessSemantics.com

www.BusinessSemantics.com

What SBVR Is

- "Semantics of Business Vocabulary and Business Rules" (SBVR)

- Effectively two specifications in one i.e. a *semantic model* for:

  - **terminological ontology (formal terminology, SBVR vocabulary)** - as a cohesive set of interconnected concepts, not just a list of terms and definitions, and

  - **behavioural guidance (policy, rules, etc.)** that govern the actions of subject of the terminological ontology *(formal terminology)*.

- Developed by 17 organizations in 7 countries

- Adopted by OMG in September 2005

- Published as formal OMG specification January 2008. See:

  http://www.omg.org/cgi-bin/doc?formal/08-01-02.pdf

- First specification under the Object Management Group's new stream of Model-Driven Business specifications

SBVR - a Synthesis of Four Disciplines

1. TERMINOLOGY & VOCABULARY:

    –   **The foundation for SBVR** is ISO TC 37 (Terminology and Language & other Content Resources) terminology science standards ISO 704 and 1087

        • About human communication using special purpose language in the context of natural language

An ISO Terminology Is a Dictionary – Except …

- Like lexicography – development of natural language dictionaries

  – Rooted in Natural Language and Human Communication

- Different in these ways:

  – Concept-centric; not word centric (meanings in concept systems)

  – Special Purpose language only

  – Definitions built in terms of characteristics with built-in taxonomies

  – Concept Relations as Entries

SBVR - a Synthesis of Four Disciplines

2. FACT-ORIENTED MODELING with interpretation in FORMAL LOGIC:

    – **The precision of formal logic** was added to ISO 1087-1 concepts, designations, and concept relations by fact-oriented modelling*

        • Precise meanings for SBVR Vocabulary and Behavioural Guidance enables them to be transformed into IT system designs without losing or changing the business semantics.

* See ISO Technical Report TR 9007:1987, "Concepts and Terminology for the Conceptual Schema and the Information Base", and "A Logical Analysis of Information Systems: Static Aspects of the Data Oriented Perspective" (http://www.orm.net/Halpin_PhD thesis.pdf)

SBVR - a Synthesis of Four Disciplines

3. LINGUISTICS & LINGUISTIC ANNOTATION OF NATURAL LANGUAGE GRAMMAR

- **Target natural language grammar structures** (*external to SBVR*) were provided by:
  - linguistics,
  - ISO TC 37/SC 4 "Linguistic Representation" standards, and
  - de-facto industry standards

  as input to the design of SBVR **semantic formulations** so that they would both:
  - adequately formulate in logic to provide a formal interpretation of the most complicated **definitions and logic statements** expressed using selected natural language grammar features, and
  - adequately connect these **definitions and logic statements** to the underlying SBVR vocabulary of concepts and representations via verb concepts (*ISO TC 37 concept relations made formal by fact-oriented modeling*)

- Provided the basis for a future rich multilingual natural language notation for SBVR

SBVR - a Synthesis of Four Disciplines

4. BUSINESS PRACTICE of VOCABULARY & BUSINESS RULES:

    –   **Practical applicability of SBVR in Organizations** was provided by hundreds of collective man-years experience in business consultancy applying vocabulary and business rule approaches to the needs of organizations

Ways SBVR adds Knowledge Richness
to ISO TC 37 Terminology

Semantic Communities enable cross-discipline / cross-'subject field' capability with support for adopting concepts

Meanings Belong to Semantic Communities

Semantic Communities Share Meanings

Semantic Community

Definition   community whose unifying characteristic is a shared understanding (perception) of the things that they have to deal with

Necessity   Each semantic community *is united by* exactly one body of shared meanings.

- A semantic community defines the scope of an SBVR Body of Shared Meanings:

    - what concepts (both noun concepts and verb concepts) are to be included

    - what business rules it needs to build on them

- Usually, the most important semantic community is the organization for which you are building the SBVR Body of Shared Meanings, e.g. EU-Rent

- You will often have to consider other semantic communities that do or could share some of the vocabulary,

    - e.g. the car rental industry, national trade associations, EU-Rent customers

- When you define rules, you do it from the perspective of the owning semantic community

Owned & Adopted Concepts

- ## Adoption is important:
  - Reduces work in maintaining business vocabulary
  - Supports communication with organizations that have interests in common
  - Creates consistency across vocabularies

- ## Vocabulary adoption is about adopting 'symbols' (signifiers associated with meanings)

- ## Concepts are adopted two ways:
  - By reference – via an adopted vocabulary, e.g. <u>rental</u>, <u>rental car</u> (*from 'Car Rental Industry Standard Glossary'*)
  - By name – Individual concept, e.g. <u>Switzerland</u>

- ## When an "owner" vocabulary is revised,
  - all the "users" of the vocabulary have to be considered –
    - this is a good thing!

SBVR provides strong support for adoption

Speech community, subject field, and other concepts provide context to disambiguate multiple uses of the same signifier to designate concepts

Representations Belong to Speech Communities

Speech Community Share Representations
(Language & Terms)

Speech Community

Definition	subcommunity _of_ a given semantic community whose unifying characteristic is the vocabulary and language that it uses
Example	The EU-Rent UK Community shares the English-based vocabulary of symbols used in EU-Rent's business. The symbols include English words for EU-Rent's concepts plus symbols adopted from other languages
Dictionary Basis	group of people sharing a characteristic vocabulary, and grammatical and pronunciation patterns for use in their normal intercommunication W3ID ['speech community']
Necessity	Each speech community _is of_ exactly one semantic community.
Necessity	Each speech community _uses_ exactly one language.
Necessity	Each speech community owns exactly one set _of_ representations.
Necessity	Each speech community _owns_ at least one vocabulary.

Designation Disambiguation Contexts

- **speech community**

- **subject field**

designation context

Concept Type: role

Definition: concept that characterizes the domain of usage within which the expression of a representation has a unique meaning for a given speech community

…speech community… ¦ …subject field… ¦ …designation context… ¦ …designation…

Statements, Fact Type Forms *(Verb Concept Designations)*, Definitions added to Designations to create Representations

Meanings and Representations
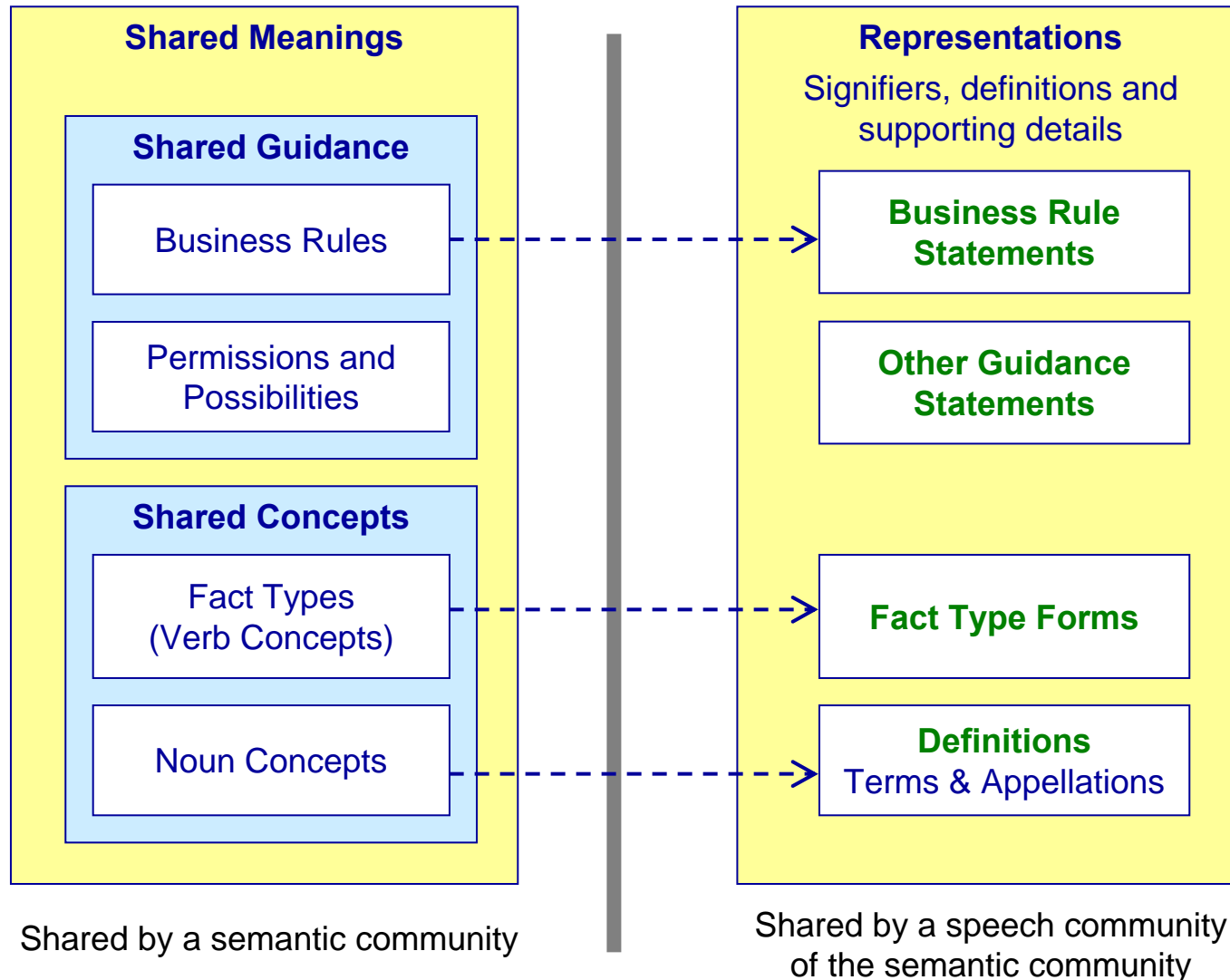
Shared Meanings

Shared Guidance

Business Rules

Permissions and Possibilities

Shared Concepts

Fact Types
(Verb Concepts)

Noun Concepts

Representations

Signifiers, definitions and supporting details

Business Rule Statements

Other Guidance Statements

Fact Type Forms

Definitions
Terms & Appellations

Shared by a semantic community

Shared by a speech community of the semantic community

"SBVR and Business Ontology" -- EDOC vorStand Workshop September 15, 2008 16

Natural language definitions and other statements can be understood in terms of formal logic

Business Rule

It is obligatory that the <u>drop-off date</u> of a <u>rental</u> precedes the <u>expiration date</u> on the <u>driver's license</u> of the <u>customer</u> responsible for the <u>rental</u>.

It is obligatory that

precedes

the <u>expiration date</u> on

the <u>driver's license</u> of

the <u>customer</u> responsible for

the <u>drop-off date</u> of a <u>rental</u>
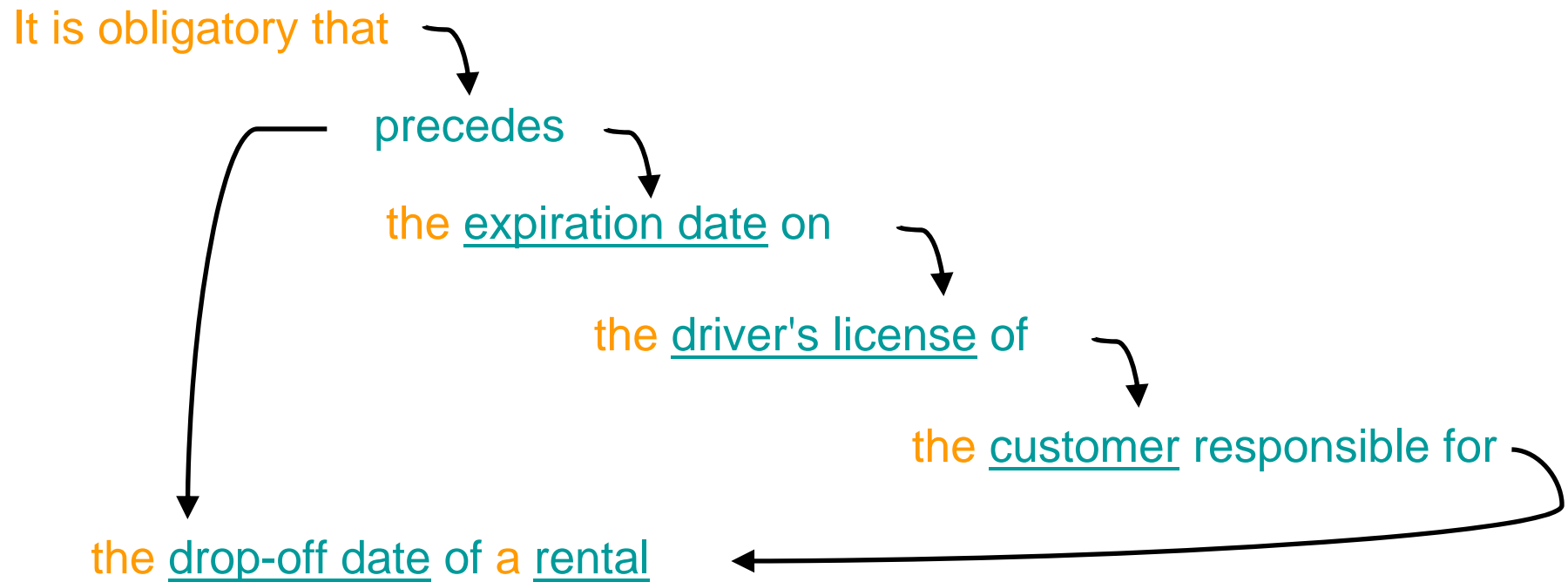
Formal interpretation of characteristics and intensions can determine whether two definitions are of the same concept or different concepts

Intensions & Semantic Equivalence of Concepts

- The set of essential characteristics for a concept is:

  - the set of necessary and sufficient characteristics that determines the things that are in the extension of, are instances of, the concept

  - is the combination of:

    - the delimiting characteristics in the intensional definition of the concept,

    - all the delimiting characteristics of each of the more general concepts to the top of the inheritance tree, and

    - a characteristic for the 'more general concept' if it is not 'thing'

- Two concepts are same or different based on whether or not they:

  - do or do not have semantically equivalent sets of essential characteristics

- Concepts don't change – they are just different concepts

  - Connection of a term to a concept can change over time *(usually gradually)*

Multidimensional classification

Categorization Schemes *(Dimensions)*

categorization scheme

Definition: scheme for partitioning things in the extension of a given general concept into the extensions of categories of that general concept

categorization scheme is for general concept

Definition: the general concept is divided into category(s) by the categorization scheme

categorization scheme contains category

Definition: the category is included in the categorization scheme as one of the categories divided into by the scheme

segmentation

Definition: categorization scheme whose contained categories are complete (total) and disjoint with respect to the general concept that has the categorization scheme

Synonym: partitioning

Roles and facets (*perspectives, aspects*) of general concepts treated explicitly and formally

Noun Concepts – Examples

- **Fundamental**:

  - car (adopted)

- **Category of some more general concept:**

  - rental car *is a category of* car, with delimiting characteristics (unary verb concepts):

    - *is owned* (by a EU-Rent local area)

    - *is rented* (is used for rental by EU-Rent)

- **Role in verb concept:**

  - rental car *has roles* rented car and replacement car *in*
    'rented car *is replaced by* replacement car *during* rental'

- **Facet** (aspect):

  - customer [Car Rentals]: customer who rents cars

  - customer [Vehicle Sales]: customer who buys a rental car at the end of its rental life

Defined reference schemes
for general concepts to connect them
with the names of the individual
concepts associated with them

Reference Scheme

- Needed for all general concepts whose instances need to be identified by the business

- Example:

rental car

Definition:	car that *is owned by* EU-Rent and is used for rentals
Reference Scheme:	VIN

car model

Definition:	Type of car supplied by a manufacturer with a standard specification that includes body style, engine size, and fuel type(s).
Note:	EU-Rent bases its model names on those assigned by the car manufacturers, but sometimes has to extend them to distinguish models, for example with/without air conditioning.
Reference Scheme:	manufacturer code, model id

Concept relations enriched with definitions, concept roles, & generic relations to create verb concepts

(subject-verb-object plus, sometimes, preposition-object) that are interpretable in formal logic

Verb Concepts – Examples

- Verb concepts

  - Unary (characteristic): <u>rental</u> *is open*

    - 1 placeholder, filled by '<u>rental</u>'

  - Binary: <u>rental car</u> *is assigned to* <u>rental</u>

    - two placeholders, filled by '<u>rental car</u>' and '<u>rental</u>'

  - N-ary: <u>replacement car</u> *replaces* <u>rented car</u> *during* <u>rental</u>

    - three placeholders representing roles, filled by '<u>rental car</u>', '<u>rental car</u>' and '<u>rental</u>'

- Can objectify a verb concept and use it as a noun concept:

  - '<u>replacement car</u> *replaces* <u>rented car</u> *during* <u>rental</u>' can be objectified as 'car exchange' plus:

    - <u>car exchange</u> *provides* <u>replacement car</u>

    - <u>car exchange</u> *replaces* <u>rental car</u>

    - <u>car exchange</u> *occurs during* <u>rental</u>

Definitions in SBVR Structured English
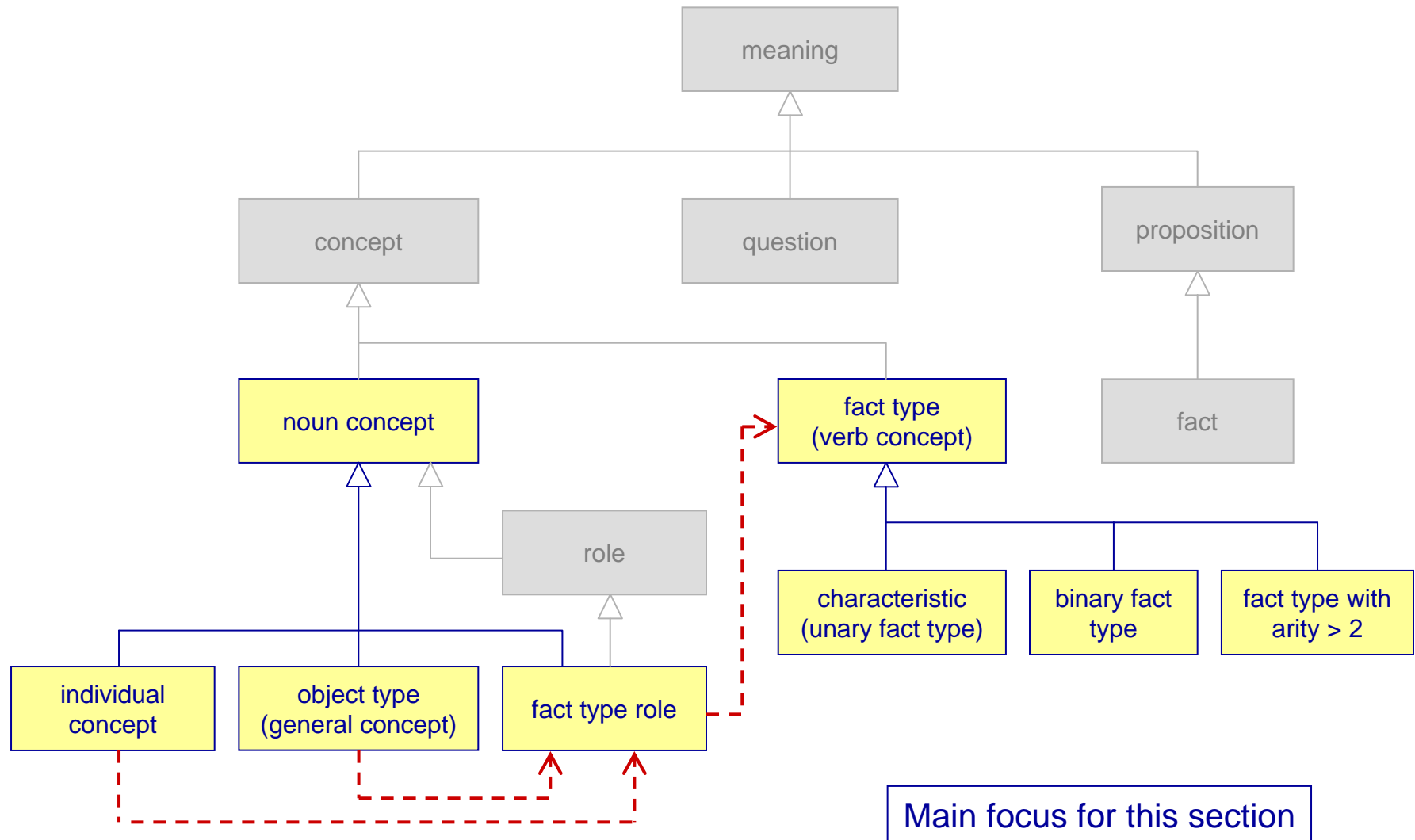
meaning

concept

question

proposition

noun concept

fact type
(verb concept)

fact

role

characteristic
(unary fact type)

binary fact
type

fact type with
arity > 2

individual
concept

object type
(general concept)

fact type role

Main focus for this section

Characteristics can be expressed as definitional /structural rules

Examples of Characteristics = Definitional Business Rules

- Characteristic, e.g.

  rental organization unit *maintains cars*

- In intensional definition:

  service depot

      Definition: rental organization unit that *maintains cars*

- As Necessity:

  service depot

      General Concept: rental organization unit

      Necessity: Each service depot *maintains cars*

- As Definitional Rule:

  service depot

      General Concept: rental organization unit

  It is necessary that each service depot *maintains cars*

Formal specification of behavioral guidance in terms of the terminology

Defining a Business Rule

Underlying verb concept (in SBVR's Vocabulary for Business Rules):

element of guidance *is based on* verb concept

We know that (also in SBVR's Vocabulary for Business Rules):

element of guidance *introduces* an obligation or necessity

business rule *is a category of* element of guidance

So, in the SBVR Business Vocabulary+Rules for a specific business (e.g. EU-Rent)

- Start with a verb concept, e.g.

    rental *is guaranteed by* credit card

- Apply an obligation or necessity to it, e.g.

    it is obligatory that each rental *is guaranteed by* a credit card

- Then,add qualifications, quantifications and conditions, if necessary e.g.

    it is obligatory that each rental *is guaranteed by* a credit card that *is held by* the renter who *is responsible for* the rental

Architecture for Transforming SBVR Terminology-based Business Models to IS requirements & Data Models

BASED ON

the OMG's new MDA Foundation Model
as applied to both
the Organization and
its Business Application Software

Business Model vs. Information System Model

Business Ontology
(Formal Business Terminology)

- - -

... other Business Model topics:
- • behavioral guidance
- • business process
- • organization & responsibilities
- • geography & logistics

- ● ABOUT the Business
- ● FOR Business purposes
- ● FROM a Business perspective
- ● IN the actual language used by Business staff
- ● BY the Business

Two-Way Negotiation

Business Needs →

← Requirements Satisfied

Business Customer   **IT Supplier**

• **Structures for Data**
• **Constraints**

- - -

... other Information System Model topics:
- • services / methods
- • network
- • user interface
- • etc.

Business Model   Information System Model

From business view to IS view

SBVR Vocabulary & Rules

Behavioural Rules

Business Ontology

Business Policy Maker

about things in the subject world

Customer   Employee

Transformations

Procedures for people in the business

Automated Rules

Data Model

IT System Model

End-to-end Workflow / Process Model

about structures for recording/storing data

Stored Data

Customers

Employees

Cars
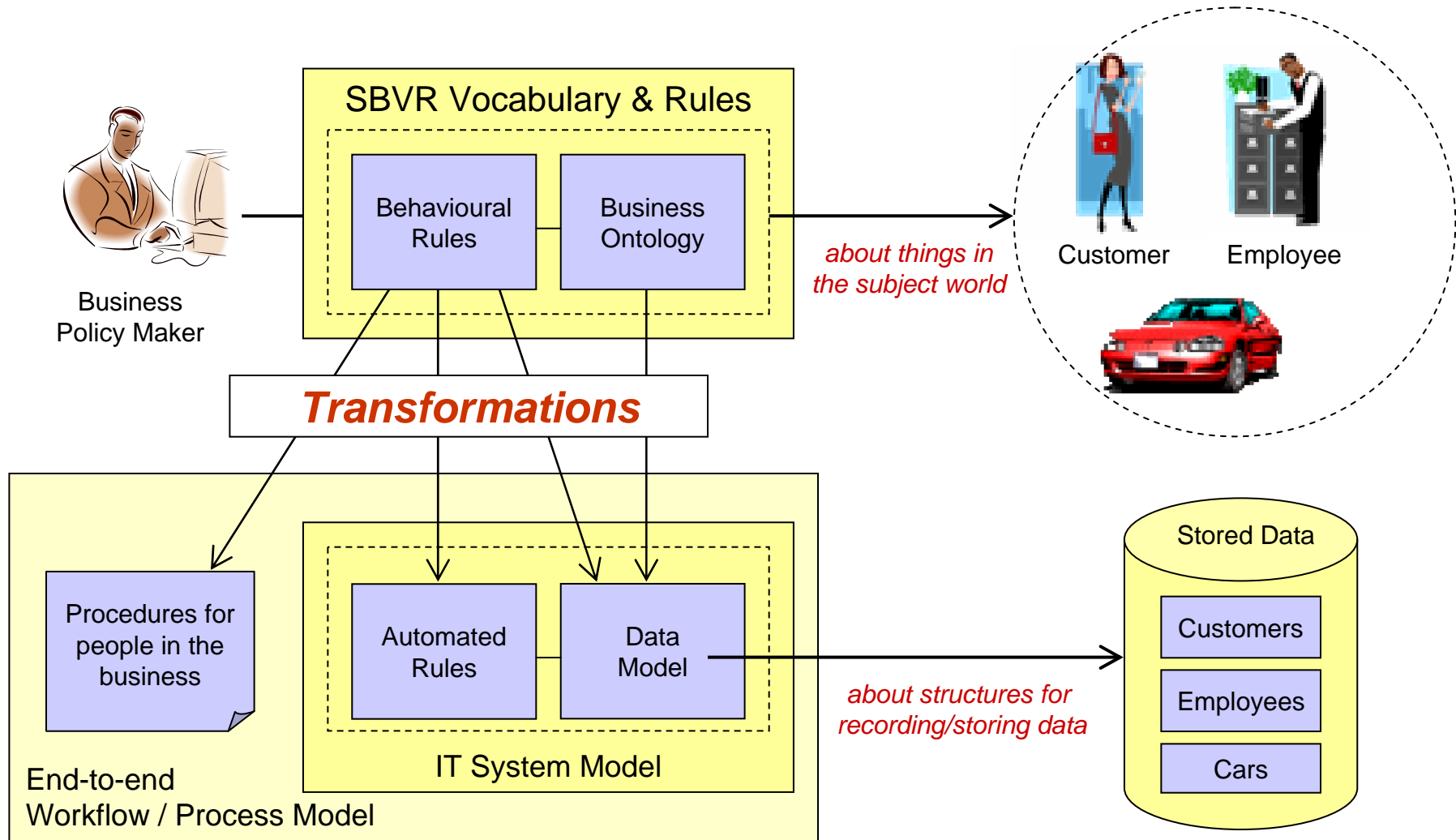
Essential Business Model

essential business model

- **class-of-platform independent model of the enterprise as an organization**
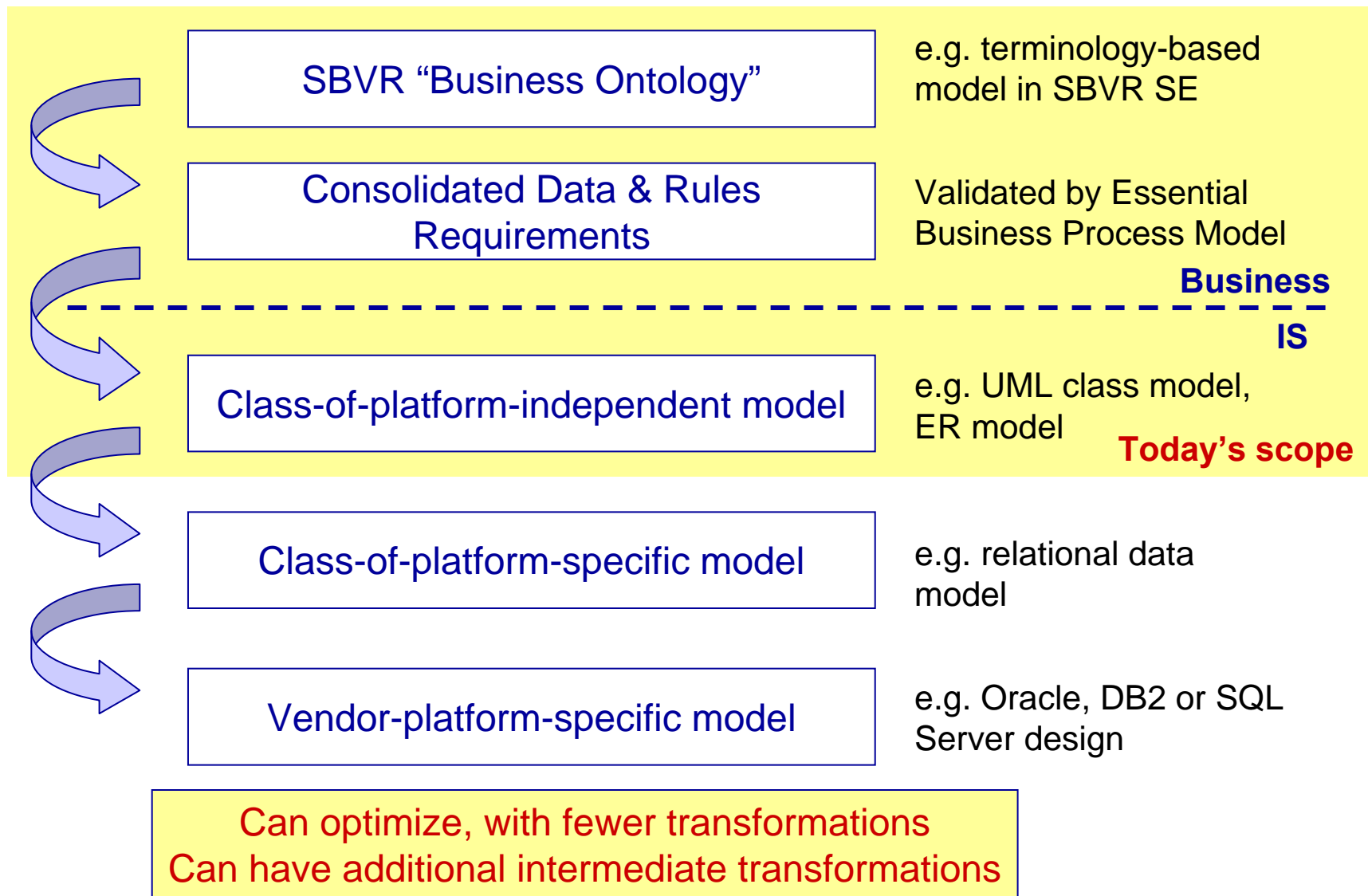 - "Essential" (as in *of the essence*, not as in *necessary*)
  - Independent of whether people or automated equipment will do the work
  - Used to make these decisions
  - Independent of any technologies
  - Used to choose technologies and design the class-of-platform specific models
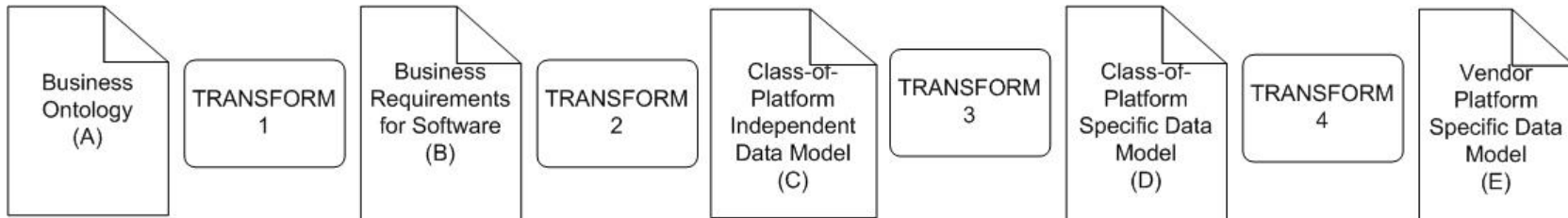
essential business process model

- **essential business model** that models the enterprise's business processes
  - Focuses on "bringing about new, original things, directly or indirectly by communication"*
    - All tasks are about decisions, judgements, and engaging in commitments only
    - Included are the **"NEED to KNOW & NEED to REMEMBER"** requirements of bottom level **tasks** for **kinds of business facts** as defined in the **business ontology** (formal business terminology)
  - Excludes all *(manual and automated)* information processing considerations
    - Excludes all information processing actions, transforms, movement and information storage
    - Does not include document, data or information artefacts flowing through the tasks of the process

*see "performa" pp 105-106, 144-148 in Dietz, Jan L.G. *Enterprise Ontology: Theory and Methodology. Springer, 2006.*

Transformations

SBVR "Business Ontology"

e.g. terminology-based model in SBVR SE

Consolidated Data & Rules Requirements

Validated by Essential Business Process Model

Business

IS

Class-of-platform-independent model

e.g. UML class model, ER model

Today's scope

Class-of-platform-specific model

e.g. relational data model

Vendor-platform-specific model

e.g. Oracle, DB2 or SQL Server design

Can optimize, with fewer transformations
Can have additional intermediate transformations

Transform Shortcuts for Specific Situations

| Business Ontology (A) | TRANSFORM 1 | Business Requirements for Software (B) | TRANSFORM 2 | Class-of-Platform Independent Data Model (C) | TRANSFORM 3 | Class-of-Platform Specific Data Model (D) | TRANSFORM 4 | Vendor Platform Specific Data Model (E) |

Shortcuts that Continue to Bridge the Way Business People Think, Talk & Write and Implemented Software

Combine Transforms 3 & 4:
Ability to more easily implement the Class-of-Platform Specific Model with a different vendors product will be significant reduced

Combine Transforms 2 & 3:
Ability to more easily implement the information system architecture using a different class-of-platform will be significant reduced

Combine Transforms 2, 3 & 4:
Implementing with a different vendor or class-of platform and vendor will require an almost complete redesign of the information processing system

Combine Transforms 1 & 2:
Ability to trace and deal with all the impacts of changes in the essential business process and its data needs will be greatly reduced

Shortcuts the Diminish the Software's Connectedness to the Way Business People Think, Talk & Write
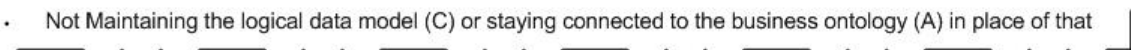
Omitting or Inadequately Performing Transform 1:
- Not keeping and managing a business ontology (A) as a language asset for the organization
- Not using and staying connected to an active business ontology (A) while creating Consolidated Data & Rules Requirements Specifications

Omitting or Inadequately Performing Transform 2:
- Not creating a Consolidated Data & Rules Requirements (B) based on data originations and uses in the business of the organization
- Not using and staying connected with an Consolidated Data & Rules Requirements (B) or the logical data model (class-of-platform independent data model (C))

Only Maintaining the Physical Data Model:
- Not Maintaining the logical data model (C) or staying connected to the business ontology (A) in place of that

Transforms from SBVR to Database Designs

Is about real 'business' things

Is about 'recorded data' and buckets that hold data

A-1

Business Ontology + Rules
(ISO 704 & 1087 + SBVR)

(Natural Language Ontology & Policy Resources)

Essential Business Process Task
NEED to KNOW
+
A-2 NEED to REMEMBER
Business Facts

… etc.

A

Essential Business Model

Manual information processing component of Executable Tasks

(rest of)
Class-of Platform Specific Model & Vendor Platform Specific Model

Business Model

Extracted View – Business Ontology

B-C Notify of Changes

Linked: Read-only Access

Business Requirements For Software

B **Consolidated Data & Rules Requirements**

Additional Functional Requirements

Performance & Design Requirements

Request Changes

Transform 1
Apply Data Req of Tasks to SBVR Ontology

Transform for Business Requirements for Software other than Data Not Shown

Two-Way Negotiation

External Design

Requirements Satisfied

Transform 2a
SBVR to another Form for Meaning[1]

Computation Independent Model of Data[1]

Business Semantics for Business Data

B-S Metadata Registry

Transform 2b
Apply to Processing Info Req. Model

Class-of-Platform Independent Model

C

Logical Data Model – Data Storage Unoptimized

Transform 3
Apply CofP to Tech.-Indep. Model

Class-of-Platform Specific Model / Vendor Platform Independent Model

Relational Data Model – Optimized independent of Vendor

D

Transform 4
Apply Vendor to CofP Model

Vendor Platform Specific Model

Relational Data Model– Relational Vendor-Specific Optimizations

E

Semantic Metadata[1] for **Data**

Computational but Data *Store* Type Independent

Relational Data*base* – Vendor Independent

Relational Data*base* – Vendor Specific

Business Customer
(Business Analysts)
(Purchasing)

IT Supplier
(Account Managers)

[1]Possible Forms for Meaning
- Fact-Oriented (SBVR / ORM / CogNIAM)
- Attribute-Oriented (ISO 11179 / UML / ER / OWL)

Business

See http://www.omg.org/cgi-bin/doc?bmi/08-06-08.ppt
for full OMG presentation

Information System

Appendices

- SBVR Touch Points with ISO TC 37 Standards

- Further Development of SBVR

- Applications of SBVR Already in Progress

- Emergence of Tool Support of SBVR

- SBVR Methods / Best Practice

- SBVR Resources

Thank you!

Appendices

SBVR Touch Points
with ISO TC 37 Standards

OMG, ISO, W3C and OASIS

Touch Points with ISO TC 37/SC 1

- Terminology with added Knowledge Richness features
  - **SC 1/WG 3**
    - **ISO 704** *Terminology work — Principles and methods*
      - Foundation for SBVR
    - **ISO 1087-1** *Terminology work — Vocabulary — Part 1: Theory and application*
      - Foundation for SBVR
  - **SC 1/WG 2**
    - **ISO 860** *Terminology work – Harmonization of concepts and terms*
      - Terminology harmonization and content/semantic integration
  - **SC 1/WG 5**
    - **TR 24156** *Guidelines for applying concept modelling in terminology*
    - **SBVR Annex H** *Use of UML Notation in a Business Context to Represent SBVR-Style Vocabularies* (informative)
      - SBVR multidimensional classification

Touch Points with ISO TC 37/SC 2

- … none

Touch Points with ISO TC 37/SC 3

- Terminology with added Knowledge Richness features
  - **SC 3/WG 2**
    - **ISO 1087-2** *Terminology work — Vocabulary — Part 2: Computer applications*
      - Supplements SBVR
  - **SC 3/WG 3**
    - **ISO/DIS 12620** *Terminology and other language and content resources — Specification of data categories and management of a Data Category Registry for language resources*
      - Supplements SBVR
    - **ISO/DIS 30042** *Term-Base eXchange (TBX) format specification*
      - SBVR terminology interchange format (SBVR Clause 13 + Clause 15 accompanying files)
  - **SC 3/WG 4**
    - **ISO/CD 26162** *Computer applications in terminology — Design, implementation and maintenance of Terminology Management Systems*
      - SBVR terminology interchange format (SBVR Clause 13 + Clause 15 accompanying files)
    - **ISO 16642:2003** *Computer applications in terminology -- Terminological markup framework*
      - SBVR terminology interchange format (SBVR Clause 13 + Clause 15 accompanying files)
  - **SC 3/TAG**
    - **Preliminary Work Item (PWI) 22274** *Localization aspects for object data modelling*
      - SBVR Annex H Use of UML Notation in a Business Context to Represent SBVR-Style Vocabularies (informative)

Touch Points with ISO TC 37/SC 4

- Language Analysis/Annotation
  - **SC 4/WG 2**
    - **NP 24617-2** *Semantic Annotation Framework – Part 2: Dialogue acts*
      - SBVR performative + proposition structure
  - **SC 4/TDG 6**
    - Multilingual ontology data categories
      - SBVR as a terminological ontology

Further Development of SBVR

Where might SBVR be Going in the Future?

- First SBVR RTF *(March 2009)*
  - primary objective: finish mapping to ISO Common Logic and OWL
- ISO TC 37 adoption process for SBVR *(has begun)*
- Other harmonization / transform definition activities to be undertaken:
  - Terminology Science vs. Information Science (modeling, metadata and data)
  - TC 37 terminology standards + SBVR to ISO 11179 Metadata Registry standard
  - ISO TC 215 WG 3 – Healthcare Semantics
- Generic Vocabularies
  - Date & Time *(in progress)*, Weights & Measures, Geographic, Math
- Vertical Industry Vocabularies by OMG Domain Task Forces
- Standard Notation(s) for SBVR RFP *(being discussed)*
- Terminology Content Availability in Online Databases & Registries *(possibilities only)*
  - ISO Standards as Databases – Terminology online and free
  - Euro Term Bank
  - Terminology/Vocabulary Services for Vocabulary Adoption

Principles in Linguistic Annotation Frameworks were Design Targets for SBVR Semantic Formulations

- **"Linguistic Annotation Framework"** *(i.e. natural language grammar structure metamodel)* **Resources**
  - The discipline of Linguistics
    - MIT book on linguistic engines
      - http://books.google.co.uk/books?id=_cv4i6heNmwC&dq=linguistic+analysis+engine&source=gbs_summary_s&cad=0
  - ISO TC 37/SC 4 "Linguistic Representation" standards
      - http://www.tc37sc4.org/what_.php
  - Defacto industry standard - Xerox PARC Lab linguistic technology
    - LinguistX engine from Business Objects
      - http://www.businessobjects.com/product/catalog/linguistx/
    - Xelda from TEMIS
      - http://www.temis.com/index.php?id=124&selt=1
  - Other Commercial Linguistic Engines
    - IBM LanguageWare Linguistic Engine
      - http://www-306.ibm.com/software/globalization/topics/languageware/index.jsp
  - Open Source Linguistic Engines
    - NooJ Linguistic Development Environment
      - http://195.220.182.190/site/pages/nooj.html; http://acl.ldc.upenn.edu/H/H05/H05-2006.pdf
    - SIL Linguistic Freeware
      - http://www.sil.org/computing/catalog/
  - Additional References to Lingusitic Engines
    - Linguistic Annotation (http://www.ldc.upenn.edu/annotation/)
    - LIRICS: Linguistic Infrastructure for Interoperable Resources and Systems (http://lirics.loria.fr/)

SBVR Notation to be Standardized

- A draft OMG Request for Proposal for SBVR Notations will be considered at the OMG's June Technical Meeting

- Focus will be on mapping to standard metamodels for cross-natural Linguistic Annotation Frameworks *(i.e. natural language grammar structure metamodels -- see slide 14 for examples)*

  - *NOT a new **artificial** language – a **selected subset of natural language** grammar structures & associated words*

- RFP may require:

  - A mapping of SBVR Semantic Formulations to one for more Linguistic Annotation Frameworks

  - How to specify, based on cross-natural language Linguistic Annotation Framework, the subset for a given natural language that will constitute the SBVR natural language notation for that language

    - The specified subset of one or more natural language that is the standard SBVR notation for that language

      - In particular, a standard English language SBVR notation

  - How to specify an SBVR notation that is not a natural language in a ways that demonstrates compliance with SBVR semantics

    - One or more standard SBVR graphic notations

OMG SBVR-related activity

- Business Motivation Model:

  – Accepted September 2005 for consideration as existing standard to be adopted

  – Accepted December 2007 for publication as an OMG Specification

- Completion of related OMG specifications: BPDM, OSM, PRR:

- Alignment across OMG business-oriented specs:

  – Interfaces

  – Common vocabulary

  – Business Architecture emerges

- Transforms to MDA CIM and PIM

- Submission of RFP responses using SVBR? (Has been done in one submission for OSM)

- Interest from Regulatory Compliance DSIG

Reusing "Business Vocabulary"

- Take SBVR specification, excluding "Business Vocabulary for Business Rules"

- Use it to define vocabularies for other aspects of business modelling, e.g.

  - "Business Vocabulary for Business Process"

  - "Business Vocabulary for Organization Structure" (already done in on OMS RFP submission)

  These are examples of SBVR's self-extensibility

- Then will have consistency for vocabulary definition – and for MOF/XMI-compliant interchange

- When creating a business model for a specific business, use the same vocabulary for all aspects

World Wide Web Consortium

- See rules as a major part of Semantic Web and Web services

- Has established Rule Interchange Format (RIF) Working Group

  - http://www.w3.org/2005/rules/wg

  - Chartered in November 2005 for 2 years; extended by 6 months

  - Version 1 publication scheduled for June 2008

  - SBVR is one of the major inputs: ongoing liaison with OMG (also for ODM and PRR)

Applications of SBVR Already in Progress

Business Uses of SBVR Already in Progress

- Risk, Governance, and Compliance

- Globalization/Localization and Translation

- Communication and Documentation
  - SBVR Document Authoring Word Add-in specifications negotiated with natural language process vendor

- Document and Content Index Creation
  - Proof of concept generation of document (back of the book) indexes from an SBVR Vocabulary in a multinational pharmaceutical company

- Training
  - Use to structure the knowledge taught in IT training programme of Loyalis (The Netherlands) in a way that is integrated across courses

- Business Language–centered Requirements for Information Systems
  - Product Discount Management project for a multinational pharmaceutical company – saved the company £100 million to date
  - Commercial use: PNA Group CogNIAM Studio; Rule Arts "RuleXpress"

IT Uses of SBVR Already in Progress

- Document Browse and Search and Text Analytics
  - Proof of concept Document Browse and Search based on document (back of the book) indexes generated from an SBVR Vocabulary at multinational pharmaceutical company

- Business Intelligence and Data Analytics
  - A Blue Cross / Blue Shield company

- Data Architecture, Management and Quality
  - PNA Group CogNIAM Studio

- Message-Based Middleware Architecture
  - Initial discussions on using SBVR to add semantics to ISO 20022 "Universal Financial Industry Message Scheme" via using SBVR to support ISO 11179

- Advanced Intelligence Capabilities
  - EU Framework 7 project in final stages of negotiation

- Rule-based Application Software Development, Generation and Configuration
  - Rules engine vendor creating an SBVR front end to their rules-based application development tool

- Software Localization

- Reverse Engineering Software to Business Requirements
  - Business Vocabulary / Rules Specialist software assistance from reverse engineering from software to SBVR business ontologies and rules (Unisys, KDM Analytics, and others)

- Software Assurance
  - Software Assurance policies in SBVR. Software faults defined in SBVR for outsource contracts (US Department of Defense, KDM Analytics)

Emergence of Tool Support of SBVR

Emerging SBVR Tools

- DANTERMcentret "i-Term Suite" *-- available now for sale* (http://www.i-term.dk/)

    - Strong support for ISO 704 and 1087-1 on top of which the vocabulary part of SBVR is built; includes:
        - Subject field
        - Full coverage for noun concepts
        - Partial coverage for verb concepts *(concept relations)*
        - Multilingual capability

    - Special feature – ability to graphically show more general concepts and delimiting characteristics, the components of intensional definitions.

- PNA Group CogNIAM Studio *-- available now for sale* (www.pna-generics.nl)

    Strong support for fact modeling and definitional business rules, plus some transforms to application generation

- Rule Arts "RuleXpress" *-- available now for sale* (http://www.rulearts.com/)

    Strong support for business rule analysis and statement, as well as the vocabularies needed to support rule statements

Emerging SBVR Tools

- Neumont University" "NORMA" *-- open source tool available now*
  (https://sourceforge.net/projects/orm)

  Strong support for fact modeling and definitional business rules

- MDT-SBVR Eclipse Project *-- open source tool, first release available June 2009*
  (http://wiki.eclipse.org/MDT-SBVR)

  Open source component of the Model Development Tools (MDT) subproject to provide a metamodel implementation and sample tools based on the SBVR specification

Emerging SBVR Tools

- KnowGravity "KnowEnterprise™/Business" -- available now for evaluation, subject to negotiation with KnowGravity (http://www.knowgravity.com/pdf-e/KnowEnterprise-BU%20E.pdf)

  … Built on the Artisan UML platform. Supports SBVR but not Structured English. Has integrated repository for BMM, SBVR, BPMN, UML and SYSML.

- Business Semantics Ltd "SmartGlossary™" -- available now, only as part of a consulting engagement (www.BusinessSemantics.com)

  Strong support for semantic communities, speech communities *(multilingual)* & expression disambiguation context with simple forms/tables user interface

- Unisys "Rules Modeler" → Microsoft -- *commercial tool under development (probable ship - end 2009)*

  - the demonstration software supporting OMG's adoption of SBVR

  - software and technology bought by Microsoft in March 2008. Several teams members employed by Microsoft

  - most likely incorporated into a "Textual Modeling Language" *(codenamed "D")* which is a declarative programming language utilizing a LISP enabled editor (http://blogs.zdnet.com/microsoft/?p=1159)

  - part of the OLSO set of technical investments of Microsoft's Connected Systems Division (http://www.microsoft.com/soa/products/oslo.aspx)

SBVR Methods / Best Practice

SBVR Methods / Best Practice

- Vocabulary/Terminology Content

  - ISO 704 Concept System Design (How to create definitions)

  - Pavel Terminology Tutorial
    (http://www.termiumplus.gc.ca/didacticiel_tutorial/english/lesson1/index_e.html)

  - Object Role Model (ORM) Methodology (includes structural rules)

    - Halpin, Terry A. Information Modeling and Relational Databases. San Francisco: Morgan Kaufmann, 2001.

  - SBVR Case Study (SBVR Annex E)

  - Various SBVR tutorials

- Policy & Rules Content

  - SBVR Structured English (SBVR Annex C & D)

  - Informal SBVR UML Profile (SBVR Annex H)

  - RuleSpeak™ Notation (SBVR Annex F) and Methodology (commercial)

  - ORM Notation (SBVR Annex I) and Methodology (see book above)

  - CogNIAM Notation and Methodology (see Annex L)

  - Various rule discovery and documentation methodologies

NOTE: Vocabulary/Terminology & Rules *Management* out of scope for SBVR

SBVR Resources

Reading Guide for SBVR

1. An article, "**SBVR: What is Now Possible and Why**?" describing the essence of SBVR and its business and IT uses that generate business value. (http://www.BRCommunity.com/a2008/b407.html)

2. **Annex A: Overview of the Approach** (http://www.omg.org/docs/formal/08-01-02.pdf)

3. **"How SBVR adds Knowledge Richness to ISO TC 37 Terminology Standards"** (see http://www.BusinessSemantics.com for full version of this presentation)

4. **SBVR Tutorial** (Metadata Open Forum 2009) (see http://metadataopenforum.org/download.php?4040ff5f920155ff556ba1c427c641a4)

5. **Annex E: EU Rent Example** case study – (http://www.omg.org/cgi-bin/doc?formal/08-01-02.pdf) *(browse for a feel for an SBVR model rather than detailed understanding of entries)*.

6. **Annex C: SBVR Structured English** & **Annex D: SBVR Structured English Patterns** for reading SBVR Structured English in Annex E and Clauses 7-12.

7. **Annex H: Use of UML Notation in a Business Context to Represent SBVR-Style Vocabularies** for interpreting diagrams in Annex E and Clauses 7-12.

8. **Clauses 8 & 11 SBVR Vocabulary** *(formal terminology, terminological ontology)*

9. **Clause 12: SBVR Guidance** *(Policy/Rules)*

10. **Clause 10: Providing Semantic and Logical Foundations for Business Vocabulary and Rules** *(especially Clause 10.2 which relates SBVR to ISO 24707 Common Logic and OWL)*

11. **Clause 9: Semantic Formulations** *(for specifying notations, especially restricted natural languages, for definitions and guidance statements for interpretation in formal logic)*.

12. **Clause 13: SBVR's Use of MOF and XMI** *(SBVR XMI & XSD Interchange Files)*

References

1. "Comparison of Many Aspects of Terminology, Semantic Metadata, Data Models & Data" Chart

   www.BusinessSemantics.com/Resources/terminology_comparison.pdf

2. OMG's "The MDA Foundation Model"

   http://www.omg.org/cgi-bin/doc?ormsc/07-06-03.pdf

3. "MDA Foundational Model applied to both the Organization and Business Application Software" Diagram v1-0

   http://www.omg.org/docs/bmi/08-03-19.pdf

4. "Business Architecture as the Application of the MDA Foundation Model to 'Organizations'"

   Presentation to Open Group Business Architecture Working Group, Glasgow, April 23, 2008

   http://www.omg.org/docs/bmi/08-05-02.pdf

5. The Deep Structure of Business Processes, Jan L.G. Dietz

   http://www.demo.nl/option,com_docman/task,doc_download/gid,1/Itemid,81/

6. "Approximate Traceability from Terminology/SBVR to Data Models" Chart

   www.BusinessSemantics.com/Resources/terminology_traceability.pdf

SBVR Resources

- "Semantics of Business Vocabulary & Business Rules" Specification

    – http://www.omg.org/cgi-bin/doc?formal/08-01-02.pdf

- "Semantics of Business Vocabulary & Business Rules" Tutorial

    – http://www.BusinessSemantics.com/SBVR_Tutorial.pdf

- "Semantics of Business Vocabulary & Business Rules" Overview (Annex A)

    – http://www.omg.org/cgi-bin/doc?formal/08-01-02.pdf

- "Semantics of Business Vocabulary & Business Rules" EU Rent Example (Annex E)

    – http://www.omg.org/cgi-bin/doc?formal/08-01-02.pdf

- SBVR Foundation

    – www.sbvrfoundation.eu