Business Rules by the Book
SBVR Basics

Keri Anderson Healy
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References:
Semantics of Business Vocabulary and Business Rules (SBVR)
Business Rules Manifesto
BusinessRulesGroup.org

about Keri Anderson Healy

Keri Anderson Healy serves as Editor of BRCcommunity.com and its flagship on-line publication, Business Rules Journal. BRCcommunity.com, hosted and sponsored by Business Rule Solutions LLC, is a vertical community for professionals working with business rules and related areas.

Keri is a Principal in the Automated Reasoning Corporation (ARCorp Inc.), a firm specializing in describing rational policies with the intent of guiding or automating their execution. Her focus continues to be on the creative and practical application of modeling techniques to business problems. She has over forty years experience in developing cross-discipline applications within an architected framework for both the private and public sectors.

Keri was a founding member and original Chair of the Business Rules Group (BRG). She has served as Technical Editor on several major publications, including the original GUIDE white paper on Business Rules, the revision to the IEEE IDEF1X language standard (which updated the classic IDEF1X data modeling language to an object modeling language), the BRG’s Business Motivation Model paper, and, most recently, The Semantics of Business Vocabulary and Business Rules (SBVR), now an OMG standard.

Keri authored the data and behavior modeling components of the University of Washington’s DRM/Distance Learning program. She has long been an adjunct faculty member of The Evergreen State College, where she developed the curriculum on rule and object modeling techniques.

Keri received a B.A. from Texas Tech University and her M.A. from the University of Southern California.
Business Rules by the Book ~ SBVR Basics

Today:

- What is a business rule . . . a good business rule?

- By the book: SBVR for business rules (and vocabulary)

- Practical tips for creating quality business rules & vocabularies

→ an update on the latest release of SBVR

What is a “Business Rule”?

Business Rules Manifesto
The Principles of Rule Independence
http://www.businessrulesgroup.org/bromanifesto.htm

Article 1. Primary Requirements, Not Secondary
Article 2. Separate From Processes, Not Contained In Them
Article 3. Deliberate Knowledge, Not A By-Product
Article 4. Declarative, Not Procedural
Article 5. Well-Formed Expression, Not Ad Hoc
Article 6. Rule-Based Architecture, Not Indirect Implementation
Article 7. Rule-Guided Processes, Not Exception-Based Programming
Article 8. For the Sake of the Business, Not Technology
Article 9. Of, By and For Business People, Not IT People
Article 10. Managing Business Logic, Not Hardware/Software Platforms
A rule is about the business.

... not about a **system** supporting the business.

Rules are about business practice and guidance ... the running of the business.

- motivated by business goals and objectives.
- shaped by various influences (internal & external).

Rules form the boundary between what is acceptable & not acceptable.

“**A rule-of-thumb is this:** If you threw away the system — any system, even pencil and paper — would the rule still be important in running the business? Business people should be managing business things, not system things.”

— Ron Ross


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A rule is expressed in the language of the business.

... not programming **code**, computerese, or platform-specific syntax.

A business rule differs from a ‘rule engine rule’.

- It is stated in business-understandable language ... not Geek-Speak.

- It is accessible to business people ... not embedded in code.

“**Business people don’t set variables** and they don’t call functions.”

— Don Baisley, Microsoft

Architect of Rules Modeler while at Unisys

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References:
Business Motivation Model (BMM)
BusinessRulesGroup.org
also an OMG standard
A rule is under business jurisdiction.

... not an external law or rule imposed on the business.

If it is not “under business jurisdiction” it is not a Business Rule.

- Law of Nature ... not a Business Rule.

- Regulation imposed* ... not a Business Rule.

* but the business’ chosen response is a Business Rule.

"under business jurisdiction" means that the business can enact, revise, and discontinue the business rule as it sees fit.

sign in a local restaurant:

It’s the law!
If you appear intoxicated, we cannot serve you alcohol and must remove your drink.

A rule is practicable.

... not fuzzy or open to varying interpretations.

Rules are a part of the business knowledge fabric ~ building-block fashion:

- Rules are based on facts.
- Facts build on concepts, as expressed by terms.

Business Rules are ‘practicable’.

Consider this test: “Would a worker who is duly authorized and capable know what to do or not to do when she reads it?”

— Ron Ross

A rule’s expression is well-formed.

... not ad-hoc.

Rules have a formal basis — they can be:
- validated for correctness by business people.
- verified against each other for consistency.

Rules are expressed declaratively, in natural-language sentences for the business audience.

Expressing business rules declaratively is a key means of liberating the business from the perils of IT-speak.
— Ron Ross
Business Rule Concepts (4th Ed.)

A rule is distinct from any enforcement defined for it.
- A rule and its enforcement are separate concerns.

A rule is separate from process.

... not contained as a node or step within a workflow or use case.

Each rule stands on its own ... it is not procedure; it is not process.

Rules, and the ability to understand and to change them effectively, are fundamental to improving business adaptability.

Change happens!

“Definitions give you continuity of understanding.
Rules give you the ability to change.” — Agility

— Ron Ross, Forum Tutorial
What is a “Business Rule”?

From the “Business Rules Manifesto”

- A rule is about the **business**.
  ... not about a system supporting the business.

- A rule is expressed in the **language of the business**.
  ... not programming code, computerese, or platform-specific syntax.

- A rule is **under business jurisdiction**.
  ... not an external law or rule imposed on the business.

- A rule is **practicable**.
  ... not fuzzy or open to varying interpretations.

- A rule’s expression is **well-formed**.
  ... not ad-hoc.

- A rule is **separate** from process.
  ... not contained as a node or step within a workflow or use case.

Consider some rules in the news ....

**Growing Movement to ‘Buy American’ Debates the Term**
What Is an ‘American’ Car? Firms Offering Bonuses To Employees Disagree

**CAROLINA COUCH CONTROVERSY**
Local Busybodies Target the Front Porch

**Fast-Food Law is Aesthetics, not Taste**
Starbucks Challenges Local Ordinance Ban
"Mistake #2": Not focusing on terminology

"It is imperative that the business recognizes the need for consistent terminology ... when you are writing business rules the terminology is your key to success."

— Gladys Lam, Principal, Business Rule Solutions

Business Rules by the Book ~ SBVR Basics

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- By the book: SBVR for business rules (and vocabulary)

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⇒ an update on the latest release of SBVR
What is SBVR?

Semantics of Business Vocabulary and Business Rules (SBVR) v1.2

- a standard ... document available, with supporting files, at: http://www.omg.org/spec/SBVR/
- from the OMG

- **Who is the OMG?** (Object Management Group)
  - standards organization ... consortium of computer-industry companies
  - both large and small ... a range of membership plans

- **SBVR Timeline**
  - June 2003: OMG issued RFP (Request for Proposal) as "Business Semantics of Business Rules (BSBR)"
  - July 2003: Business Rules Team (BRT) was formed
    - Diverse mix: practitioners, methodologists, academics, vendors
  - Jan. 2004: BRT drafted Initial Response
  - Sep. 2005: BRT’s Final Response (SBVR) adopted by OMG
  - Sep. 2007: SBVR Finalization completed
  - Dec. 2007: SBVR approved
  - Jan. 2008: SBVR v1.0 published
  - Apr. 2013: SBVR v1.1 published
  - Nov. 2013: SBVR v1.2 published
  - early 2015: SBVR v1.3 published [target]
    - ... & work continues under the SBVR 1.4 RTF

What is SBVR? Where did it come from?

**Participant organizations**

Adaptive*
Automated Reasoning Corporation*
Business Rule Solutions, LLC*
Business Rules Group*
Business Semantics Ltd*
CA Inc.
Colibra
Centro Cultura Innovativa d’Impresa
Deere & Company
EDMcouncil.org
EMC
eStep Associates
e-Business Management Section
Escape Velocity
Fujitsu Ltd*
Hendryx & Associates*
Hewlett-Packard Company*
International Business Machines
InConcept*
LibRT*
Inferware
KDM Analytics
KnowGravity Inc*
MEGA Intl.*
Microsoft
Model Systems*
Neumont University*
No Magic, Inc.
NIST
Perpetual Data Systems*
PNA Group*
Sandia National Laboratories*
Rule ML Initiative*
Thematix Partners LLC
TIBCO
USoft
Unisys Corporation*
University College Cork
X-Change Technologies Group*
88solutions

**Sizable team:** 20 original* organizations (Submitters & Supporters), with more joining the work on SBVR 1.1 and beyond

**Geographically-distributed:** 7 countries across North America, Europe, Asia
about SBVR

synthesis of Four Disciplines

- **Terminology & Vocabulary**

- **Business Practice of Business Rules**
  Business Rule Group’s papers on Business Rules

- **Formal Logics**
  Dr. Terry Halpin’s Object Role Modeling (ORM)

- **Linguistics & Communication**
  Unisys’ work on the linguistic expression of Business Rules

SBVR is *The Book on Business Vocabulary & Business Rules*

- supports the development/specification of
  - business vocabularies (nouns & verbs, with their definitions)
  - business rules (and other kinds of elements of guidance)

- reflects a business perspective ... *not an IT systems perspective*

- uses the language of the business ... *not the terminology of IT models, or www-speak*

- independent of whether or not rules/vocabulary will be automated

what does SBVR standardize?

- a metamodel for developing semantic models of **business vocabularies** and **business rules**
  - a structured **Vocabulary** for talking about meaning, vocabularies, and business rules
  - a **Model** (and **XML schema**) for representing the semantics of vocabularies and business rules
  - the **Model** is derived from the **SBVR Vocabularies**
  - the **XML schema** is derived from the **Model**

what does SBVR **NOT** standardize?

- **NOT** language for stating rules
- **NOT** diagramming conventions
- **NOT** methodology
- **NOT** how to map business vocabularies/rules to application systems/databases
- **NOT** how to transform business rules into production rules for execution
SBVR document(s)

SBVR document ~ audiences

Part I — Introduction
1  Scope
2  Conformance
3  Normative References
4  Terms and Definitions
5  Symbols
6  Additional Information

Part II — Business Vocabulary+Rules
7  Vocabulary Registration Vocabulary
8  Meaning and Representation Vocabulary
9  Logical Formulation of Semantics Vocabulary
10 Providing Semantic and Logical Foundations
11 Business Vocabulary
12 Business Rules

Part III – Annexes (Informative)
A - SBVR Structured English
B - SBVR Structured English Patterns
C - Use of UML Notation in a Business Context
   to Present SBVR Style Notation
D - Additional References

E - Overview of the Approach
F - The Business Rules Approach
G - EU-Rent Example
H - The RuleSpeak® Business Rule Notation
I - Concept Diagram Graphic Notation
J - The ORM Notation for Verbalizing Facts and Business Rules
K - ORM Examples Related to the Logical Foundations
L - Mappings and Relationships to Other Initiatives
M - A Conceptual Overview of SBVR and the NIAM2007 Procedure to Specify a Conceptual Schema

Business Vocabulary+Rules Administrators/Integrators
Business Analysts (& business people in general)
Designers of vocabulary and rules software tools for business people
Linguists, Semanticists, Logicians

Designers of infrastructure for tool interchange of business vocabulary and rules content
EU-Rent: a comprehensive example

Annex G - EU Rent Example

NOTE. This MTR Model User's Guide is published as a separate document under the assumption that it will be updated regularily. The MTR has been assumed to be updated, given the changes in the EU-Rent's specifications, or the way in which it can be updated under the EU-Rent's specifications.

Subpart 1 - Introduction

G.1 Purpose

G.2 Scope

G.3 Rules

EU-Rent: overview of EU-Rent’s business

- EU-Rent rents cars to its customers. A rental customer may be an individual or an accredited member of a corporate customer (a company or similar organization).
- A car rental is a contract between EU-Rent and one person, the renter, who is responsible for payment for the rental and any other costs associated with the rental (except those covered by insurance). This personal responsibility exists whether the renter is a private individual or a member of a corporate customer.
- The renter of a rental (the person contractually responsible for the rental) must be authorized as a driver for that rental. Additional drivers may be authorized for the rental.
- A car may be rented by a booking made in advance, or immediately by a ‘walk-in’ renter.
- Different models of car are offered, organized into groups. All cars in a group are charged at the same rates within a country.
- EU-Rent has a loyalty club. Gold Club members have special privileges (such as access to a comfortable waiting lounge). Members accumulate points that they can use to pay for rentals.
- EU-Rent records ‘bad experiences’ with customers (such as unauthorized late return from rental, damage to car during rental, unpaid parking and speeding tickets) and may bar such customers from having subsequent rentals.
- Renters pick up their rented cars from, and return them to, EU-Rent branches. Branches may be operated by EU-Rent on sites that it owns or leases, or they may be third-party agencies in locations such as hotels and travel agents’ offices.
- A rental may be ‘round-trip’ (in which case the car is returned to the branch from which it was picked up) or ‘one-way’ (in which case the car is returned to a branch different from the pick-up branch). The booking for a one-way rental must specify the return branch.
- In addition to its branches, EU-Rent operates its own service depots. A kind of service or repair that is scheduled, then performed, on a EU-Rent Vehicle by one of EU-Rent’s service technicians.
Two kinds of **noun concept**:

- **general concept**
- **individual concept**

**general concept**

Definition: a **noun concept** that classifies things on the basis of their common properties

Designated by a **term**

e.g., the meaning of:

- **customer**
- **rental car**
- **currency**
**Business vocabulary by the book: nouns**

**individual concept**

Definition: noun concept that corresponds to only one object [thing]

Source: ISO 1087-1 (English) (3.2.2) [individual concept]

designated by a name
e.g., the meaning of:

- Switzerland
- Eiffel Tower
- Jimmy Carter

**Business vocabulary by the book: definitions**

care about definitions

definition

Definition: representation of a concept by a descriptive statement [expression] which serves to differentiate it from related concepts

Source: ISO 1087-1 (English) (3.3.1) [definition]

e.g., the difference between:

- customer
- gold customer

**gold customer**

Definition: customer that has more than 12 rentals in a calendar year
• customer

• gold customer

e.g., the difference between:

1. state the more general concept

2. qualify with the distinguishing characteristics

answers: “What is the essence?”

SBVR calls these intensional definitions
intensional definition

Definition: definition which describes the intension of a concept by stating the superordinate concept and the delimiting characteristics

Source: [ISO 1087-1 (English) (3.3.2) intensional definition]

extensional definition

Definition: description [definition] of a concept by enumerating all of its subordinate concepts under one criterion of subdivision

Source: [ISO 1087-1 (English) (3.3.3) extensional definition]

business currency

Definition: Euro or Pound Sterling or US Dollar or Swiss Franc

verb concept

Definition: concept that ... is the meaning of a verb phrase that involves one or more roles

Formery: fact type

verb concepts have verb concept wordings

verb concept wording

Definition: representation of a verb concept by an expression that has a syntactic structure involving a signifier for the verb concept and signifiers for its verb concept roles

e.g.,
- car group includes car model
- car model is included in car group
- branch is located in operating country
- branch is included in operating country
**Communities ~ sharing concepts and terms**

**community**
- Definition: group of people having a particular unifying characteristic in common

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

**body of shared meanings**
- Definition: set of concepts and elements of guidance for which there is a shared understanding in a given semantic community

*Example:* semantic community: The Car Rental Industry with its body of shared meanings: concepts that are generally accepted as important across that community

**speech community**
- Definition: subcommunity of a given semantic community whose unifying characteristic is the vocabulary and language that it uses

**vocabulary**
- Definition: set of designations and fact type forms primarily drawn from a single language to express concepts within a body of shared meanings

**language**
- Definition: system of arbitrary signals (such as voice sounds or written symbols) and rules for combining them as used by a nation, people, or other distinct community

*Example:* speech community: The EU-Rent English Community with its EU-Rent English Vocabulary

speech community: EU-Rent German Community, EU-Rent Service Depots

speech community: BRCommunity.com, BRForum Attendees, Roomba Users
**Business rules by the book: rule v. policy**

**business rule**
Definition: *rule* that is under business jurisdiction

**business rules** are derived from **business policies**

**business policy**
Definition: *element of governance* that is not directly enforceable whose purpose is to guide an enterprise

e.g., the difference between:

**Policy:** “Safety is our first concern.”

**Rule:** “A hardhat must be worn on a construction site.”

in SBVR terms: a **business rule** is ‘practicable’

sufficiently detailed and precise that a person who knows the business rule can apply it effectively and consistently in relevant circumstances to know what behavior is acceptable or not, or how something is understood.

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**Business rules by the book: behavioral v. definitional**

**business rule**
Definition: *rule* that is under business jurisdiction

Two kinds of **business rule**:

- **behavioral** (operative)
  ~ a guide for conduct or action

- **definitional** (structural)
  ~ criteria for shaping concepts
**Business rules by the book: behavioral rules**

**behavioral business rule**

Definition: business rule that is a claim of obligation

aka operative business rule

- tells what is obligated to be true ... what must be true
  - has the sense of obligation or prohibition
- governs what the business does ... intended for people
- ‘practicable’ ... not necessarily automatable

“A gold customer must be allowed access to the waiting lounge.”

**Business rules by the book: definitional rules**

**definitional business rule**

Definition: rule that is a claim of necessity

aka structural business rule

- says what is always true by definition
  - has the sense of necessarily so or impossible
- typically how inferences or calculations are made

* e.g., A customer is always considered a gold customer if the customer has more than 12 rentals during a calendar year.

The total base charge of a rental is always computed as the car group rate times the number of rental time units, plus any additional charges, minus any customer discount.

“A branch is always located in exactly one country.”
**Business rules by the book: enforcement of rules**

Only a behavioral business rule can be ‘broken’.

A behavioral business rule has an enforcement level.

**Definition:**
Position in a graded or ordered scale of values that specifies the severity of action imposed in order to put or keep a behavioral business rule in force.

- Indicates how strictly the rule will be enforced.
- Independent of what the enforcement action is.

Some enforcement levels:
- **Strictly-enforced**: no escape from the consequences.
- **Pre-authorized**: okay if approved in advance.
- **Guideline**: suggestion only; no consequence.

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**When is a ‘rule’ not a rule?**

What about guidance that is practicable but that is not a:

- prohibition, obligation, necessity, or impossibility?

  **e.g.** “There is no weight restriction for hand baggage.”

  - It does not place any obligation (or prohibition) on action.
    - Not a behavioral rule.
  
  - It does not establish some necessary (or impossible) criteria.
    - Not a definitional rule.
  
  - It does not remove any degree of freedom.
    - Not even a rule.

  **So ... what is it?**
**Kinds of advice: permission v. possibility**

**advice**
- never removes a degree of freedom ... so not a rule.
- does provide guidance ... along with rules.
- is practicable

**advice of permission**
Definition: *advice that is a claim of permission*

**advice of possibility**
Definition: *advice that is a claim of possibility*

**When is it useful to capture advice?**
- to clarify that there is *no rule* — no obligation, no necessity.
- to define *exceptions* and *authorizations*.

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**Business rules by the book: exceptions to rules**

**Light World**
where...
- anything not expressly *prohibited* is *assumed permitted*
- anything not expressly declared *impossible* is *assumed possible*

**SBVR assumes a light world.**

*However, some cases call for ‘dark areas’ in a light world...*

**Dark World**
where...
- anything not expressly *permitted* is *assumed prohibited*
- anything not expressly declared *possible* is *assumed impossible*
Business rules by the book: exceptions to rules

... cases that specify exceptions  (this includes ‘authorizations’)

an example

Restricted Parking Zone Rule
A vehicle may park in a restricted parking zone only if a Parking Zone Exemption authorizes that the vehicle park in the restricted parking zone.

Taxi Exemption
Any taxi may park in any taxi-signed restricted parking zone.

Fact:
The Taxi Exemption is a Parking Zone Exemption.

*This illustrates just one approach. See SBVR 12.4 for others.

Business rules by the book: exceptions to rules

Remember ...

“Exceptions to rules ... are rules.”

A rule is a rule is a rule ...

(It’s turtles all the way down.)
Today:

- What is a business rule . . . a good business rule?

- By the book: SBVR for business rules (and vocabulary)

  - Practical tips for creating quality business rules & vocabularies
Have an approach for discovering rules

"Do invest your time in your rule harvesting and elaboration work. On average we now find that close to 75-80% of the time it takes to complete a rule is spent in the elaboration (specification). Coding the rule and testing it takes next to nothing once the elaboration is done."

— Paul Avilez, Principle Software Developer, Liberty Mutual

"The key is really figuring out how to discover those rules and to do it consistently first."

— Jeff Wegner, Business Architect, West Bend Mutual Insurance

Pattern Questions

patterns of questions to apply when harvesting business rules from business models

✧ the Zachman Framework

six basic engineering questions
Have an approach for discovering rules

✦ Pattern Questions

For example

**General Pattern Question for ‘When’**

- Pattern Question G5: When
  - When should something occur? What deadline or limit on cycle time applies? What timing criteria apply to a business tactic or business policy?
  - Sample business tactic: Fill orders from good customers before other orders.
  - Ask specifically: How fast should orders from good customers be filled?
  - Sample business rule specifying a timeframe: An order placed by a good customer must be filled within 2 days.

There are over three dozen pattern questions to assist in the discovery of business rules.

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Select a language for writing rules

“One thing I'm a big advocate for is ... having a consistent way to capture your business rules. Do have that established before your first rules project.”

— Joe Garrity, Rules Domain Architect, The Hartford

"If you are the only person doing the work and if you know what do to, a formal methodology might not be necessary. You can adjust, adapt, and learn as you go. However, if there is a team who needs to produce deliverables that have to fit together at the end, it is good — in fact, necessary — to have a recipe."

— Gladys Lam, Principal, Business Rule Solutions
Select a language for writing rules

A rule can be expressed in many ways.

For example, some rules, stated in business-understandable language, using terms defined by business people

How many rule statements?

Remember — the expression may be in ‘non-text’ form

The SBVR practitioner has language choices

- **SBVR Structured English (SBVR-SE)**
  one way of using English that maps mechanically to SBVR concepts and what SBVR uses to present its own vocabularies
  - documented in SBVR Annex A

- **RuleSpeak®**
  a business rule notation developed by Business Rule Solutions, LLC (BRS) that has been used with business people in actual practice in large-scale projects since the second half of the 1990s
  - documented in SBVR Annex H

- **Object Role Modeling (ORM)**
  a conceptual modeling approach that has been used in industry for over 30 years, as both a graphical and textual language for specifying business rules
  - documented in SBVR Annexes J and L

- & more . . .

There is no “SBVR Language”
The SBVR practitioner has language choices: SBVR-SE

**SBVR Structured English (SBVR-SE)**

*uses font styling in its expressions:*

<table>
<thead>
<tr>
<th>Language</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term</td>
<td>used for general nouns, such as customer, policy, car, pizza, library book, late charge</td>
<td>customer, policy, car, pizza, library book, late charge</td>
</tr>
<tr>
<td>Name</td>
<td>used for specific individuals, such as Eiffel Tower, Switzerland, 200</td>
<td>Eiffel Tower, Switzerland, 200</td>
</tr>
<tr>
<td>Verb</td>
<td>used for verbs and verb phrases, such as rents, drives, requests, is checked out</td>
<td>rents, drives, requests, is checked out</td>
</tr>
<tr>
<td>Keyword</td>
<td>used for linguistic symbols, such as quantifiers (at most one, each, some), logical operators (and, or, if, only), and modal operators (it is obligatory that / must, it is necessary that / always). Also used for punctuation marks.</td>
<td>at most, each, some, and, or, if, only, it is obligatory that / must, it is necessary that / always, punctuation marks</td>
</tr>
</tbody>
</table>

The SBVR practitioner has language choices: RuleSpeak

**RuleSpeak® guidelines for stating a rule**

<table>
<thead>
<tr>
<th>Modality claim type</th>
<th>Statement form</th>
<th>SBVR Structured English keywords</th>
<th>RuleSpeak keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obligation claim</td>
<td>'obligative statement' form</td>
<td>it is obligatory that</td>
<td>r must s</td>
</tr>
<tr>
<td>Obligation claim embedding a logical negation</td>
<td>'prohibitive statement' form</td>
<td>it is prohibited that</td>
<td>r must not s</td>
</tr>
<tr>
<td></td>
<td>'restricted permission statement' form</td>
<td>it is permitted that</td>
<td>r may only s only t</td>
</tr>
<tr>
<td>Permissibility claim</td>
<td>'unrestricted permission statement' form</td>
<td>it is permitted that</td>
<td>r may s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>r need not s</td>
<td></td>
</tr>
</tbody>
</table>

free download at http://www.RuleSpeak.com
Rule Statement Templates

a comprehensive set of rule types

Rule Taxonomy

1. Containment rules (operational): data must be present or absent, and be restricted in terms of the number of instances.
   a. Mandatory data rules: one or more data items are required in a particular context.
   b. Mandatory data item rules: a particular single data item must be present.
   c. Mandatory group rules: at least one of a group of data items must be present.
2. Prohibited data rules: a particular data item is not allowed in a particular context.
3. Singleton rules: only one instance of a particular data item is allowed.
4. Dependence cardinality rules: the number of instances of a data item depends...

for each type, syntactic templates for producing natural language rule statements

Consider other presentation forms: decision table

decision rules can be presented in decision table form

Consider these individual business rule statements for a one-way rental:  — from EU-Rent

- The drop-off charge must be deemed €75 if the rental is local and its pick-up branch is an airport branch.
- The drop-off charge must be deemed (none) if the rental is local and its pick-up branch is not an airport branch.
- The drop-off charge must be deemed €325 if the rental is not local and its pick-up branch is an airport branch.
- The drop-off charge must be deemed €150 if the rental is not local and its pick-up branch is not an airport branch.

This set of rule statements can be organized & presented as a table, with its focus on the common question (decision) these rules are addressing:

<table>
<thead>
<tr>
<th>local rental?</th>
<th>pick-up at airport?</th>
<th>drop-off charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, local.</td>
<td>Yes, at airport.</td>
<td>€75</td>
</tr>
<tr>
<td>Yes, local.</td>
<td>No, not at airport.</td>
<td>none</td>
</tr>
<tr>
<td>No, not local.</td>
<td>Yes, at airport.</td>
<td>€325</td>
</tr>
<tr>
<td>No, not local.</td>
<td>No, not at airport.</td>
<td>€150</td>
</tr>
</tbody>
</table>
Consider other presentation forms: decision table

✧ some basic terminology

- the question the decision answers
- the condition
- the outcome concept
- relevant facts for one consideration

One decision rule and that rule's outcome

Potential outcomes for the four decision rules

Consider other presentation forms: decision table

✧ decision rules in table format

The presentation can be optimized:

**What is the drop-off charge for a one-way rental?**

<table>
<thead>
<tr>
<th>local rental?</th>
<th>pick-up at airport?</th>
<th>drop-off charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes</td>
<td>€ 75</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>none</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>€ 325</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>€ 150</td>
</tr>
</tbody>
</table>
Consider other presentation forms: decision table

**decision rules in table format**

Alternative arrangements are possible (here, as an "intersection style" table):

<table>
<thead>
<tr>
<th>pick-up at airport?</th>
<th>Yes, at airport</th>
<th>No, not at airport</th>
</tr>
</thead>
<tbody>
<tr>
<td>local rental?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes, local</td>
<td>€ 75</td>
<td>none</td>
</tr>
<tr>
<td>No, not local</td>
<td>€ 325</td>
<td>€ 150</td>
</tr>
</tbody>
</table>

Find more details in these papers:

- Decision Tables – A Primer: How to Use TableSpeak™
- Decision Analysis – A Primer: How to Use DecisionSpeak™ and Question Charts (Q-Charts™)

Rule writing & rule interpretation are different

"When you are writing rules, there is no good reason to use anything other than the form [you have selected]. However, out there in the English-speaking world, there are many other alternatives.... When interpreting sentences that others have written, you must be aware of these other possibilities."

– Rob van Haarst, “SBVR Made Easy”

"The business rules approach is also a fantastic way of reviewing policy, reviewing legislation."

– Frank Habraken, Consulting Program Manager, CSC
Rule writing: typical scenario in practice

✦ SBVR approach ‘bottom-up’ when capturing rules in your language of choice ...

to describe the business language of an organization in a way easily understood by business people

Rule interpretation: typical scenario in practice

✦ SBVR approach ‘top-down’ when interpreting existing regulations, policy documents, contracts, product & service specifications ...

Compliance is a major focus — consider the risk of getting it wrong ($$$ ... prison time)
In general, a covered financial institution shall establish a due diligence program that includes appropriate, specific, risk-based, and, where necessary, enhanced policies, procedures, and controls that are reasonably designed to enable the covered financial institution to detect and report, on an ongoing basis, any known or suspected money laundering activity conducted through or involving any correspondent account established, maintained, administered, or managed by such covered financial institution in the United States for a foreign financial institution. The due diligence program required by this section shall be a part of the anti-money laundering program otherwise required by this subpart. Such policies, procedures, and controls shall include:

1. Determining whether any such correspondent account is subject to paragraph (b) of this section;
2. Assessing the money laundering risk presented by such correspondent account, based on a consideration of all available factors, which shall include:
   - The type of foreign financial institution;
   - The type of correspondent account established, maintained, administered, or managed by such covered financial institution;
   - The type of jurisdiction that issued the charter, license, or license to the foreign financial institution, and, to the extent that information regarding such jurisdiction is known or reasonably available to the covered financial institution (and any of its affiliates);
   - The type, purpose, and anticipated activity of such correspondent account;
   - The nature of the foreign financial institution’s business and the markets it serves;
   - Information known or reasonably available to the covered financial institution about the money laundering activity conducted through or involving any correspondent account that is established maintained or administered by the covered financial institution that is in the United States for a foreign financial institution;
   - The anti-money laundering and supervisory regime of the jurisdiction that issued the charter, license, or license to the foreign financial institution;
   - Information about the currency that is known or is reasonably available to the covered financial institution.

Each covered financial institution must establish at least one due diligence program.

Each due diligence program that is established by a covered financial institution must include policies, procedures, and controls that are reasonably designed to enable the covered financial institution to detect and report on an ongoing basis any money laundering activity that is known or is suspected and is conducted through or involves any correspondent account that is established maintained or administered by the covered financial institution that is in the United States for a foreign financial institution.

Each policy procedure or control that is included in a due diligence program must be enhanced where necessary.

Each due diligence program that is established by a covered financial institution must be a part of an anti-money laundering program that is required by 31 CFR §1010.610 and is implemented by the covered financial institution.
**SBVR uses formal logics**

being ‘formal’ in this way means ...

- Everyone who reads the rule statement gives it the **same** interpretation.

- **Software** can ‘understand’ it in the same way.

- **Different** expression forms can be relied on to have the same meaning.

**SBVR applies two kinds of modality**

- **behavioral rules** — *(Deontic)*

- **definitional rules** — *(Alethic)*
Patterns of expression: behavioral rules

- **behavioral rules** — (Deontic)
  - Obligation
  - Prohibition (Forbidden) — and its negation, Permission

“**It is obligatory that ...**”
“... *must* ....”

“**It is prohibited that ....**”
“... *must not* ....”

“**It is not permitted that ...**”

---

Patterns of expression: behavioral rules

**a behavioral business rule**

*(informally)*  **Don’t rent to a person who is drunk.**

stated in the form of

- **Prohibition**
  - It is prohibited that an *open rental* have an *intoxicated driver*.
  - It is not permitted that an *open rental* have an *intoxicated driver*.
  - An *open rental* must not have an *intoxicated driver*.

- **Obligation**
  - It is obligatory that no *open rental* have an *intoxicated driver*.
  - An *open rental* must have a *driver* that is not *intoxicated*.

- **Restricted Permission**
  - It is permitted that a *rental* be *open* only if no *driver* of the *rental* is *intoxicated*.

---

Every **Restricted Permission** statement can be restated as **conditional prohibition** — e.g.,

- It is prohibited that a *rental* be *open* if any *driver* of the *rental* is *intoxicated*.
- It is not permitted that a *rental* be *open* if any *driver* of the *rental* is *intoxicated*. 
**Logical Equivalency (Deontic statement forms):**

<table>
<thead>
<tr>
<th>Deontic</th>
<th>Modal Formula</th>
<th>applying modal negation rules ...</th>
<th>Reading (Verbalized as):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>= (Logically Equivalent) Model Formula</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Formula</td>
<td>Reading (Verbalized as):</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deontic</td>
<td>obligation</td>
<td>Op</td>
<td>It is obligatory that \ p</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the negation of obligation:</td>
<td>\sim Op</td>
<td>It is not obligatory that \ p</td>
</tr>
<tr>
<td></td>
<td>non-obligation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>permission</td>
<td>Pp</td>
<td>It is permitted that \ p</td>
</tr>
<tr>
<td></td>
<td>the negation of permission:</td>
<td>\sim Pp</td>
<td>It is not permitted that \ p</td>
</tr>
<tr>
<td></td>
<td>prohibition</td>
<td>Fp</td>
<td>It is prohibited that \ p</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table Legend:**
- O = obligation
- P = permission
- F = forbidden
- \sim = logically equivalent
- \sim = not
- p = some proposition

---

**Patterns of expression: definitional rules**

- **deontic rules** — (Alethic)
  - Logical Necessity
    - “It is necessary that ....”
    - “… always ....”
  - Logical Impossibility ... and its negation, Possibility
    - “It is impossible that ....”
    - “… never ....”
    - “It is not possible that ....”
  - “It is possible that ....”
    - “… can ....”
    - “… sometimes ....”
Patterns of expression: definitional rules

A definitional business rule
(informally) A rental is considered open when the car is picked up.

stated in the form of

- **Necessity**
  It is necessary that the rented car of an open rental has been picked up.
  The rented car of an open rental has always been picked up.

- **Impossibility**
  It is impossible that the rented car of an open rental has not been picked up.
  It is not possible that the rented car of an open rental has not been picked up.
  The rented car of an open rental has never not been picked up.

- **Restricted Possibility**
  It is possible that a rental be open only if the rented car of the rental has been picked up.

Every Restricted Possibility statement can be restated as conditional impossibility — e.g.,

It is impossible that a rental be open if the rented car of the rental has not been picked up.
It is not possible that a rental be open if the rented car of the rental has not been picked up.

Definitional Rule Expression ~ a “cheat sheet”

Logical Equivalency (Alethic statement forms):

<table>
<thead>
<tr>
<th>Modality</th>
<th>Modal Formula</th>
<th>Applying modal negation rules...</th>
<th>(Logically Equivalent) Modal Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reading (Verbalized as):</td>
<td>Formula</td>
<td>Reading (Verbalized as):</td>
</tr>
<tr>
<td>alethic</td>
<td></td>
<td>□p</td>
<td>It is necessary that p</td>
</tr>
<tr>
<td>necessity</td>
<td></td>
<td>¬□p</td>
<td>It is possible that not p</td>
</tr>
<tr>
<td>the negation of necessity;</td>
<td></td>
<td>¬□p</td>
<td>It is not necessary that p</td>
</tr>
<tr>
<td>non-necessity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>possibility</td>
<td></td>
<td>◊p</td>
<td>It is possible that p</td>
</tr>
<tr>
<td>the negation of possibility;</td>
<td></td>
<td>¬◊p</td>
<td>It is not possible that p</td>
</tr>
<tr>
<td>impossibility</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table Legend:

- □ necessary
- ◻ possibility
- ◻ logically equivalent
- ¬ not
- p some proposition

source: SBVR Clause 10, Table 10.2
"DON'T start without a vocabulary: don't skip over that step. Make sure you have an established vocabulary before you start writing rules."

— Emily Allis-Springer, Business Architect, Unum

"Going through an extensive domain-model process before we get into building the business rules ... is very important to do. It unifies a community."

— Warren Williams, Lead Public Health Analyst, Centers for Disease Control and Prevention (CDC)

A Structured Business Vocabulary

- documents both the **nouns** and the **verbs** that are the core concepts of the business.
- is organized in the familiar text form of a business dictionary / glossary.

➡ can also take a graphical form as a **Concept Model**.

Learn more:
"I have to put in a plug for vocabulary because without a consistent terminology, or set of terms for a concept, you’re lost."

– Jerre McQuinn, Principal Solution Manager, Microsoft

"Everybody moans about doing it in the beginning because we think we’re all talking the same language, but when you start writing things down you find, "No, that’s not what I mean!" So, it’s very important to do."

– Warren Williams, Lead Public Health Analyst, Centers for Disease Control and Prevention (CDC)

For example, the EU-Rent English Community has defined its hierarchy of dictionaries (see SBVR Annex G)

<table>
<thead>
<tr>
<th>English Vocabularies</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CRISG</strong></td>
<td></td>
</tr>
<tr>
<td>Definition:</td>
<td>the (fictional) vocabulary that is owned by The Car Rental Industry</td>
</tr>
<tr>
<td>Synonym:</td>
<td>Car Rental Industry Standard Glossary</td>
</tr>
<tr>
<td>Language:</td>
<td>English</td>
</tr>
<tr>
<td>Source:</td>
<td><a href="http://www.dictionai.cri.org/crisg">www.dictionai.cri.org/crisg</a></td>
</tr>
<tr>
<td><strong>MWU</strong></td>
<td></td>
</tr>
<tr>
<td>Source:</td>
<td><a href="http://unabridged.merriam-webster.com">http://unabridged.merriam-webster.com</a></td>
</tr>
<tr>
<td>Definition:</td>
<td>the vocabulary that is known as ‘Merriam-Webster’s Unabridged Dictionary’</td>
</tr>
<tr>
<td>Language:</td>
<td>English</td>
</tr>
</tbody>
</table>

**EU-Rent English Vocabulary**

Necessity: the vocabulary that is owned by The EU-Rent English Community and is applicable to EU-Rent’s car rental business

Necessity: **CRISG** has precedence over **MWU**

The Necessity **CRISG has precedence over MWU** means that if a signifier used in the EU-Rent English Vocabulary does not have an owned or explicitly-adopted definition, and is not implicitly understood (i.e., is not consistently understood from the everyday meaning of the signifier), it should first be looked up in **CRISG** and, if it is not there, then in **MWU**.
**Work ‘vocabulary smart’: adopt where possible**

**owned definition**
Definition: **definition** that a **speech community** ‘owns’ and is responsible for creating and maintaining.

**adopted definition**
Definition: **definition** that a **speech community** adopts from an external source by providing a **reference** to the **definition**.

e.g., EU-Rent adopts Definition 2b of ‘law’ from Merriam-Webster Unabridged, using the terms ‘statute’ (primary) and ‘law’ (synonym) for their concept.

**Note!**

**SBVR ‘adopted’ many of its core concepts from the ISO Terminology standards.**

---

**Work ‘vocabulary smart’: definition as designation**

sometimes,

the definition can serve as the term / name of a concept

e.g., The Cocker Spaniel comes in three color-based varieties, named:

- “Black”
- “Parti”
- “Any Solid Color Other than Black” (ASCOB)
Business Rules by the Book ~ SBVR Basics

Today:

- What is a business rule . . . a good business rule?
- By the book: SBVR for business rules (and vocabulary)
- Practical tips for creating quality business rules & vocabularies

➡ an update on the latest release of SBVR

SBVR Update

✦ SBVR 1.3 is in final production

Primary focus: Restructure the text for improved readability

- Better integration of topical subject areas
- Shallower, broader structure
- Logical progression of entries (ISO-style)
- Emphasize linguistic foundations

Availability: early 2015