about Keri Anderson Healy

Keri Anderson Healy serves as Editor of BRCommunity.com and its flagship on-line publication, Business Rules Journal. BRCommunity.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.
The ABCs of Business Rules

Today:

- Introduction to SBVR
- Approach ~ getting started with the Business Rules Approach
- Business ~ understanding the business
- Capture ~ crafting the business rules
- Let's put SBVR to work!

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 [target]
  - ... & work continues under the SBVR 1.3 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.
Collibra
Deere & Company
EDM Council
e-Step 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 Int.
Microsoft
Model Systems*
Neumont University*
NIST
Perpetual Data Systems*
PNA Group*
Sandia National Laboratories*
Rule ML Initiative*
Thematix Partners LLC
TIBCO
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

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
about SBVR

- supports the development/specification of
  - business vocabularies (terms & 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

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 document(s)
Today:

- Introduction to SBVR
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on the importance of the Business Rules Approach

“You’ll see a night-and-day change when you take on legislative changes using the business rules approach. You can get a change done within days, which is simply not possible with the IT approach.”

— Mukundan Agaram, Enterprise Architect, Delta Dental

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

— Frank Habroken, Consulting Program Manager, CSC

“Use a methodology when you write your rules. You’ll have a long-term gain by using a methodology and having a consistently-written rules approach across your enterprise.”

— Kevin Gauley Manager, Practice Centre, Insurance Corporation of British Columbia

Gladys' "Mistake #9": Not having a business rule methodology

“If you are the only person doing the work and if you know what to do, 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.”
What is the “Business Rules Approach”?

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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References:
Business Motivation Model (BMM)
BusinessRulesGroup.org
also an OMG standard
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 Boisley, Microsoft Architect of Rules Modeler while at Unisys

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.

"Definitions give you continuity of understanding.
Rules give you the ability to change."    Agility !!
- Ron Ross,
Forum Tutorial

What is the “Business Rules Approach”?

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... not about a system supporting the business.

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A rule is practicable.
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The ABCs of Business Rules

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on the importance of business concepts & vocabulary

"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. 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)

"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

Gladys' "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."
Understanding the Business' Core Concepts as a Structured Business Vocabulary (Concept Model)

- noun concepts & verb concepts
- writing concept definitions
- being ‘vocabulary smart’
- communities of sharing
- SBVR vocabulary for Business Vocabulary

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.
Noun Concepts

Noun Concept

Definition: concept that is the meaning of a noun or noun phrase

Two kinds of Noun Concept:

- General Concept
- Individual Concept

Noun Concepts: General

General Concept

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

Source: based on ISO 1087-1 (English) (3.2.3) [general concept]

designated by a Term

e.g., the meaning of:

- customer
- rental car
- currency

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**Noun Concepts: Individual**

**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

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**Verb Concepts**

**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
writing concept definitions

Concepts have 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

1. State the more general concept
2. Qualify with the distinguishing characteristics

Answers: "What is the essence?"
Concepts have Definitions

**Definition**
Definition: representation of a concept by a descriptive statement which serves to differentiate it from related concepts.
Source: [ISO 1087-1 (English) (3.3.1) ‘definition’]

**customer**
Definition: person that buys goods or services

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

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’]

E.g.,
- **business currency**
  - Euro
  - Pound Sterling
  - US Dollar
  - Swiss Franc
a word to the vocabulary-phobic ...

Why me?!? Can't someone else be in charge of the Vocabulary task on this project?

There is relief from the ‘pain’ of Vocabulary:

- use everyday natural language as much as possible, referencing a standard dictionary.
- adopt as much as possible from authoritative sources — industry standard glossaries, ISO standards.
- use short definitions as terms and names.

---

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

---

e.g., **Semantic Community:** The Car Rental Industry with its body of shared meanings: concepts that are generally accepted as important across that community

**Semantic Community:** EU-Rent

**Semantic Community:** Business Rules Community
**Semantic Community**
- defines the scope of an SBVR Vocabulary + Rules:
  - concepts (noun concepts & verb concepts) to be included
  - what business rules it needs to build on them.
- typically, this is:
  - the organization for which you are building the SBVR Vocabulary + Rules
  - other Semantic Communities that share some of the vocabulary

  e.g., Semantic Community: The Car Rental Industry
  with its body of shared meanings: concepts that are generally accepted as important across that community

  Semantic Community: EU-Rent
  Semantic Community: Business Rules 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

  e.g., 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
being 'vocabulary smart'

- Use everyday natural language as much as possible, referencing a standard dictionary.

- Adopt as much as possible from authoritative sources — industry standard glossaries, ISO standards.

- Use short definitions as terms and names.

being 'vocabulary smart': use standard dictionaries

For example, the EU-Rent English Community has defined its hierarchy of dictionaries

(see SBVR Annex G)

**English Vocabularies**

**CRISG**
- Definition: the (fictional) vocabulary that is owned by The Car Rental Industry
- Synonym: Car Rental Industry Standard Glossary
- Language: English
- Source: www.dictionary.cri.org/crisg

**MWU**
- Source: http://unabridged.merriam-webster.com
- Definition: the vocabulary that is known as 'Merriam-Webster’s Unabridged Dictionary'
- Language: English

**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.
being '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.

being '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)


Recap: the SBVR vocabulary for Business Vocabulary

SBVR Clause 11.1

Meaning

Meaning (Concepts)

“... what you mean by what you say”

Example

I mean ...

EURO

SBVR Clause 11.2

Representation of Meaning

Expressions that represent Concepts

“I can say ...

- rental car
- Eiffel Tower

— quoting Ronald G. Ross
Business Rule Solutions, LLC

Recap: the SBVR vocabulary for Business Vocabulary

SBVR Clause 11.1

Meaning

SBVR Clause 11.2

Representation of Meaning

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**on capturing business 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

“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

**Gladys’ “Mistake #3”: Assume everyone knows what a business rule is**

“In guiding organizations in the business rules approach, one of the first things that becomes clearly apparent is that different people have different perceptions of business rules.... do not assume everyone knows what a business rule is or assume everyone thinks about business rules the same way you do.”
Crafting the Business Rules

- kinds of guidance
- kinds of guidance statement
- ‘rules’ that are not rules
- exceptions to rules
- SBVR vocabulary for Business Rules

kinds of guidance: business rules ~ business policies

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.”

Am I in compliance?

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
kinds of rule: behavioral rules ~ definitional rules

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

---

kinds of rule: behavioral (operative) business rule

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.”
**kinds of rule: definitional (structural) business rule**

**Definitional Business Rule**

*Definition:* rule that is a claim of necessity

- 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.”**

**kinds of rule: behavioral rules call for enforcement**

**only a Behavioral Business Rule can be ‘broken’**

**Behavioral Business Rule has Enforcement Level**

**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
kinds of guidance statement (expression side)

SBVR Clause 12.1
Elements of Guidance

SBVR Clause 12.2
Statements that express Elements of Guidance

one meaning ~~~ many expressions

a. different national languages
b. different language choices
c. different patterns of expression

a. expression in different languages

stated in business-understandable language, using terms defined by business people

How many rule statements?

Also, may be expressed 'non-text' form
a. expression in different languages

But not all “natural language” qualifies ...

• not “Legaldegook”

No savings and loan holding company, directly or indirectly or through one or more transactions, shall acquire control of an uninsured institution or retain, for more than one year after other than an insured institution or holding company thereof, the date any insured institution subsidiary becomes uninsured, control of such institution.

Source:
cited by Ronald G. Ross
from the Code of Federal Regulations
Chosen as the winner of the annual “Legaldegook” contest by the Plain Language Committee of the State Bar of Texas

SBVR uses ‘controlled natural language’

a subset of natural language, obtained by restricting the grammar and vocabulary in order to reduce or eliminate ambiguity and complexity

others in the family of controlled natural languages:

• ACE - Attempto Controlled English
• CLCE - Common Logic Controlled English
• PNL - Metalog's Pseudo Natural Language
• Ordnance Survey Rabbit
• PENG - Processable ENGLISH

Reference:
Wikipedia
http://en.wikipedia.org/wiki/Controlled_natural_language
b. language choices for the SBVR practitioner

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

- **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”

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b. language choices for the SBVR practitioner

- **SBVR Structured English**

uses **font styling** in its expressions:

<table>
<thead>
<tr>
<th>term</th>
<th>used for general nouns, such as customer, policy, car, pizza, library book, late charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>used for specific individuals, such as 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>
</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>
</tr>
</tbody>
</table>
c. different patterns of expression

SBVR uses formal logics

Why?!?

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.
Formal logics basis of SBVR

provenance

- **Object Role Modeling (ORM)** language / approach
  - conceptual modeling focus, initially for database domain
  - expanded to demonstrate practical value for business modeling

- **ISO/IEC 24707-2007 Common Logic (CL)**
  - framework for a family of logic-based languages

documented in

- **Clause 10.1 “Logical Foundations for SBVR”**
  - SBVR formal grounding model interpretation
  - a collaborative effort by Terry Halpin (then at Neumont), Pat Hayes (CL co-author), OMG Ontology PSIG members, and others with logics background

- **Clause 9 “Logical Formulation of Semantics Vocabulary”**
  - Semantic Formulations: structures of meaning — the logical composition of meaning
  - uses formal logics: 1st order plus limited extensions (restricted higher order)

Formal logics basis of SBVR

SBVR applies two kinds of **modality**

- **Deontic** — for **Behavioral** (Operative) Business Rules

- **Alethic** — for **Definitional** (Structural) Business Rules
SBVR uses formal logics

SBVR applies two kinds of modality

- Deontic – for Behavioral (Operative) Business Rules
  - Obligation

  “You must mow the lawn each Saturday.”

- Prohibition (Forbidden)

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

  “You must not stay out past 10pm on a school night.”
patterns of expression ~ behavioral rules

SBVR uses formal logics

SBVR applies two kinds of modality

- **Deontic** — for Behavioral (Operative) Business Rules

  - Prohibition (Forbidden) ... and its negation, **Permission**

  “You may play soccer on Sunday.”

  “It is permitted that ....”
  “... may ...”
  “... need not ....”

SBVR uses formal logics

SBVR applies two kinds of modality

- **Deontic** — for Behavioral (Operative) Business Rules

  - Obligation

  - Prohibition (Forbidden) ... and its negation, **Permission**

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

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

  “It is permitted that ....”
  “... may ...”
  “... need not ....”
Behavioral Rule Expression ~ a “cheat sheet"

logic basis for Deontic 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>Formula</td>
<td>Reading (Verbalized as):</td>
<td></td>
</tr>
<tr>
<td>deontic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>obligation</td>
<td>Op</td>
<td>It is obligatory that $p$</td>
<td>$\neg p$</td>
</tr>
<tr>
<td>the negation of obligation: non-obligation</td>
<td>$\neg Op$</td>
<td>It is not obligatory that $p$</td>
<td>$p \neg$</td>
</tr>
<tr>
<td>permission</td>
<td>$Pp$</td>
<td>It is permitted that $p$</td>
<td>$\neg p$</td>
</tr>
<tr>
<td>the negation of permission: prohibition</td>
<td>$\neg Pp$</td>
<td>It is not permitted that $p$</td>
<td>$p \neg$</td>
</tr>
<tr>
<td></td>
<td>$Fp$</td>
<td>It is forbidden that $p$</td>
<td>$\neg p$</td>
</tr>
</tbody>
</table>

source: SBVR Clause 10, Table 10.2

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.
patterns of expression ~ definitional rules

SBVR uses formal logics

SBVR applies two kinds of modality

- Alethic — for Definitional (Structural) Business Rules
  - Logical Necessity
  - Logical Impossibility

“It is necessary that ....”
“... always ....”

“A bank account always has an account holder.”

“It is impossible that ....”
“... never ....”
“It is not possible that ....”

“A given rental car is never owned by more than 1 branch.”
patterns of expression ~ definitional rules

SBVR uses formal logics

SBVR applies two kinds of modality

“An incident notice can be received after the rental is closed.”

- **Alethic** — for **Definitional (Structural) Business Rules**
  - Logical Necessity
  - Logical Impossibility ... and its negation, **Possibility**

SBVR applies two kinds of modality

- **Alethic** — for **Definitional (Structural) Business Rules**
  - Logical Necessity
  - Logical Impossibility ... and its negation, **Possibility**

- **Deontic** — for **Behavioral (Operative) Business Rules**
  - Obligation
  - Prohibition (Forbidden) ... and its negation, **Permission**

SBVR uses formal logics

“...can ....”
“... sometimes ....”

“It is possible that ....”
“It is necessary that ....”
“It is impossible that ....”
“It is not possible that ....”

“... always ....”
“... never ....”
Definitional Rule Expression ~ a “cheat sheet”

logic basis for Alethic statement forms:

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

source: SBVR Clause 10, Table 10.2

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.
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 ~ 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.
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

exceptions to rules

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

an example

No Parking!

Taxi parking

Prohibited ... except for Taxis
exceptions to rules

specifying exceptions in SBVR

an example using two guidance statements — expressing a general rule and a more specific case for taxis — with a fact that classifies the specific case (connecting it to the general case)

- **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.*

---

exceptions to rules

So ...

“Exceptions to rules ... are rules.”

A rule is a rule is a rule ...

(It’s turtles all the way down.)
Recap: the SBVR vocabulary for Business Rules

SBVR Clause 12.1
Elements of Guidance

Meaning
“… what you mean by what you say”

Expression
“… how you say what you mean”

Example
I mean …

I can say …
✦ No smoking.
✦ No fumar.

— quoting Ronald C. Ross
Business Rule Solutions, LLC
The ABCs of Business Rules

Today:

- Introduction to SBVR
- Approach ~ getting started with the Business Rules Approach
- Business ~ understanding the business
- Capture ~ crafting the business rules
- Let's put SBVR to work!

putting SBVR to work ~ rule-discovery patterns

✧ Pattern Questions

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

✧ the Zachman Framework

six basic engineering questions
**Putting SBVR to Work ~ Rule-Discovery Patterns**

✦ **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.

✦ **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 p</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 p</td>
<td>r must not s</td>
</tr>
<tr>
<td></td>
<td>‘Restricted Permission Statement’ Form</td>
<td>It is permitted that p only if q</td>
<td>r may s only t</td>
</tr>
<tr>
<td>Permissibility Claim</td>
<td>‘Unrestricted Permission Statement’ Form</td>
<td>It is permitted that p</td>
<td>r may s no r not s</td>
</tr>
</tbody>
</table>

Rule Statement Templates

**Decision Logic**

decision rules can be presented in decision table form

Consider these individual business rule statements:

- A lined raincoat should be worn if it is cold and it is rainy.
- A wool overcoat should be worn if it is cold and it is not rainy.
- An unlined raincoat should be worn if it is not cold and it is rainy.
- No coat should be worn if it is not cold and it is not rainy.

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

<table>
<thead>
<tr>
<th>What coat should be worn?</th>
<th>Is it cold?</th>
<th>Is it rainy?</th>
<th>coat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, it's cold.</td>
<td>Yes, it's rainy.</td>
<td>lined raincoat</td>
<td></td>
</tr>
<tr>
<td>Yes, it's cold.</td>
<td>No, it's not rainy.</td>
<td>wool overcoat</td>
<td></td>
</tr>
<tr>
<td>No, it's not cold.</td>
<td>Yes, it's rainy.</td>
<td>unlined raincoat</td>
<td></td>
</tr>
<tr>
<td>No, it's not cold.</td>
<td>No, it's not rainy.</td>
<td>none</td>
<td></td>
</tr>
</tbody>
</table>
**some basic terminology**

- The decision
- Considerations
- The kind of outcome
- Potential outcomes
- One consideration's elemental cases
- One intersection case & its specific outcome

<table>
<thead>
<tr>
<th>Is it cold?</th>
<th>Is it rainy?</th>
<th>coat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, it's cold.</td>
<td>Yes, it's rainy.</td>
<td>lined raincoat</td>
</tr>
<tr>
<td>Yes, it's cold.</td>
<td>No, it's not rainy.</td>
<td>wool overcoat</td>
</tr>
<tr>
<td>No, it's not cold.</td>
<td>Yes, it's rainy.</td>
<td>unlined raincoat</td>
</tr>
<tr>
<td>No, it's not cold.</td>
<td>No, it's not rainy.</td>
<td>none</td>
</tr>
</tbody>
</table>

**decision rules in table format**

The presentation can be optimized:

<table>
<thead>
<tr>
<th>Is it cold?</th>
<th>Is it rainy?</th>
<th>coat</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes</td>
<td>lined raincoat</td>
</tr>
<tr>
<td>yes</td>
<td>no</td>
<td>wool overcoat</td>
</tr>
<tr>
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<td>yes</td>
<td>unlined raincoat</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>none</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is it cold?</th>
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<th>coat</th>
</tr>
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<tbody>
<tr>
<td>yes</td>
<td>yes</td>
<td>lined raincoat</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>unlined raincoat</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>none</td>
</tr>
</tbody>
</table>
putting SBVR to work ~ decision logic

♦ decision rules in table format

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

<table>
<thead>
<tr>
<th>Is it rainy?</th>
<th>Is it cold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, it’s rainy</td>
<td>lined raincoat</td>
</tr>
<tr>
<td>No, it’s not rainy</td>
<td>unlined raincoat</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™)

SBVR-related activities in the OMG

♦ SBVR Revision Task Force (RTF)  
  work on SBVR 1.3  
  e.g., Date/Time Vocabulary  
  business planning and policy  
  rc.omg.org

♦ Foundation Vocabularies
  e.g., Date/Time Vocabulary

♦ Business Motivation Model (BMM)
  business planning and policy

♦ Regulatory Compliance DSIG
  rc.omg.org

and elsewhere

♦ ISO
  terminology standards

♦ RuleML
  Rule Markup Language

♦ Eclipse MDT / SBVR
  implementation

Get the latest information at “SBVR Insider”
  - www.BRCommunity.com/SBVR

get involved !!
(not) the end

Questions?