

Business Rules

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Literature

This chapter is mainly based on the following literature:

- Bridgeland David M.; Zahavi, Ron (2009): Business Modeling - A Practical Guide to Realizing Business Value. Morgan Kaufman Publishers. Chapter 6
- OMG Semantics for Business Vocabulary and Business Rules – SBVR, <http://www.omg.org/spec/SBVR/1.0/PDF>

Business Rules - Definitions

A Business Rule is a directive, intended to influence or guide business behavior, in support of Business Policy that has been formulated in response to an Opportunity, Threat, Strength, or Weakness.

(www.brportal.org)

A business rule is a statement that defines or constrains some aspect of the business. It is intended to assert business structure or to control or influence the behavior of the business.

(www.businessrulesgroup.org)

Business rules may be

- defined as business definitions for business use (to represent policies, practices and procedures), or
- defined as executable business rule statements for use in some ruledriven system, or
- both.

(<http://www.omg.org/attachments/pdf/PaulHarmonBParticle.pdf>)

Examples

Charging for Orders: It is obligatory that a party is charged for a menu item if the party orders the menu item and the menu item is served to the party

Splitting Bills: It is permitted that a server may split a bill only if the party agrees to bill splitting and the bill is split equally.

Greenback Only: It is obligatory that each cash payment employ US currency

No Checks: It is prohibited that a payment employ a personal check

VISA Only: It is permitted that a payment employ a credit card only if the credit card is backed by VISA™.

Structural and Operative Business Rules

- A first distinction is between
 - ◆ Operative Business Rules
 - ◆ Structural Business Rules

Operative	Structure
Obligation	Necessity
Prohibition	Impossibility
Restrictive Permission	Restricted Possibility

- Operative Business Rules describe *what should be*
 - ◆ Obligation Statements
 - ◆ Prohibitive statements
 - ◆ Restrictive Permissive Statements

Operative Rules can be violated and must be enforced

- Structural Business Rules are definitional, they describe *what is*
 - ◆ Necessity Statements
 - ◆ Impossibility Statements
 - ◆ Restricted Possibility Statement

Structural Business Rules cannot be violated, they are always true

Obligation Statements

- Many business rules oblige people (or software applications) to ensure that something is true. This is expressed by obligation statements.
- Structure of a simple obligation statement:

It is obligatory that mandatory situation

- Example of an obligation statement:

Greenback Only: It is obligatory that each cash payment employ US currency

- The obligation rules says that the persons (or software applications) have the obligation to make the mandatory situation come true.
 - ◆ An obligation statement implicitly acknowledges the possibility that a person (or software application) might attempt not to follow the rule.

Obligation Statements

- In general, obligation statements can include a condition

It is obligatory that **mandatory situation** *if* **condition**

- The condition is the scope of when the mandatory situation actually applies
- Examples:

Greenback Only B: It is obligatory that each cash payment employ US currency if the payment amount of the cash payment is at least 20 dollars

Greenback Only C: It is obligatory that each cash payment employ US currency if the cash payment is applied to a bill and the amount of the bill is at least 20 dollars

Both rules have the same mandatory situation „each cash payment employ US currency“ but different conditions

Prohibitive Statements

- Prohibitive statements are meant to prevent a specific situation.

It is prohibited that **banned situation**

- Prohibitive statements can have conditions, too.

It is prohibited that **banned situation** *if* **condition**

- Examples:

No Checks: It is prohibited that a payment employ a personal check

No Loonies: It is prohibited that a cash payment employ Canadian currency

No Loonies B: It is prohibited that a cash payment employ Canadian currency if the cash payment is applied to a bill and the amount of the bill is at least 20 US dollars

Restricted Permissive Statements

- A restricted permissive statement allows something but restricts the condition under which it is allowed

It is permitted that **permitted situation** *only if* **restriction**

- Example:

Euros Allowed: It is permitted that a cash payment employ European Union currency only if the cash payment is applied to a bill and the amount of the bill is at most 100 US dollars

- In contrast to the conditions in obligation and prohibitive statement, which are optional, the restriction in the permissive statement is required (because otherwise the whole rule would be unnecessary)
- A restricted permissive statement is violated, when the permitted situation is true even though the restriction is false.

Categories of Operative Business Rules

A common classification distinguishes 3 categories of rules

■ Constraints

- ◆ Rules making assertions that have to be true, they reject any event that would cause a violation to occur

■ Inference Rules

- ◆ Rules deriving new information from existing information

■ Process Rules

- ◆ Rules enabling, enforcing or preventing actions

Necessity Statements

- A necessity statement represents a definition, it is something that remains true.

It is necessary that assured situation

It is necessary that assured situation *if* condition

- Necessity statements express structural business rules that express
 - ◆ truth about the world or
 - ◆ truth about the way the organisation defines the world
- Examples:

Single Payment Network: It is necessary that a credit card is backed by exactly one payment network

Large Party: It is necessary that a party is large if the size of the party is at least 8.

A necessity statement looks similar to an obligation statement, but in contrast to an obligation statement it cannot be violated and need not be enforced.

Impossibility Statements

- Impossibility statements are structural rules. They state what is always false

It is impossible that incorrect situation

- Impossibility statements can have conditions.

It is impossible that incorrect situation *if* condition

- Examples:

Single Payment Network B: It is impossible that a credit card is backed by two payment networks.

Vegetarian Menu Items: It is impossible that a vegetarian menu includes an ingredient if the ingredient is meat or the ingredient is fish

Restricted Possibility Statements

- A restricted possibility statement is a structural statement describes what can be true under certain conditions

It is possible that **suitable situation** *only if* **restriction**

- Example:

Vegetarian Menu Items B: It is possible that a vegetarian menu includes an ingredient only if the ingredient is not meat or the ingredient is not fish

The Six Business Rules Forms

Operative Rule Form	Operative Rule Example	Structural Rule Form	Structural Rule Example
Obligation statement	<i>It is obligatory that each cash payment employ US currency if the cash payment is applied to a bill and the amount of the bill is at least 20 dollars.</i>	Necessity statement	<i>It is necessary that a party is large if the size of the party is at least 8.</i>
Prohibitive statement	<i>It is prohibited that a cash payment employ Canadian currency if the cash payment is applied to a bill and the amount of the bill is at least 20 dollars.</i>	Impossibility statement	<i>It is impossible that a vegetarian menu item includes an ingredient if the ingredient is meat or the ingredient is fish.</i>
Restricted permissive statement	<i>It is permitted that a cash payment employ European Union currency only if the cash payment is applied to a bill and the amount of the bill is at most 100 dollars.</i>	Restricted possibility statement	<i>It possible that a vegetarian menu item includes an ingredient only if the ingredient is not meat and the ingredient is not fish.</i>

should be true but can be violated and must be enforced

what should not be by policy

what is permitted

always true by definition, cannot be violated

something that cannot be true by definition

what is possible



Why Business Rules (1)

- Motivation: Rational Enterprises
 - ◆ Enterprises should be able to say why they act in a particular way
 - *Motivated rules are derived from policies, guide business processes and support the achievement of goals and objectives (see BMM)*
- Communication, Training and Learning
 - ◆ Guiding employees on what to do and what not to do
 - *When rules are unaccessible or unknown, people (including business developers) make assumptions that might be incorrect. This can lead to inconsistent behaviour that is not effectively focused on common objectives*
- Regulatory Compliance
 - ◆ More and more enterprises have to ensure that they observe the laws and regulations
 - *Regulations and laws have an impact on the business rules – which represent guidance for people and requirements for software systems*

Why Business Rules (2)

- Software Requirements
 - ◆ Capture constraints on behaviour of a system
 - *Business Rules allow for structured representation of constraints which are less ambiguous than text*
- Agility
 - ◆ Changes in business often demand flexible adaptation of business processes and IT systems
 - *Business Rules represent small entities of knowledge and are easier to change than software systems business process models*
- Knowledge Management
 - ◆ Capturing and preserving knowledge
 - *Business rules are a good form to capture much of the implicit knowledge that organisations want to preserve*

Enforcement

- An operative rule does not specify

- ◆ how strict it has to be followed
- ◆ who enforces the rule
- ◆ what happens when it is violated

- Example:

Greenback Only: It is obligatory that each cash payment emply US currency

- ◆ It can be strictly enforced with severe penalties (strict constraint) or be merely a recommendation (guideline)
- ◆ It can be enforced by the servant or by the restaurant manager

Enforcement Level

- An operative business rule has an enforcement level, which indicates the severity of action imposed to put or keep a rule in force
- The level of enforcement is separated from the rule statement itself
- Negative Example:

Nonrule 3: It is obligatory that each menu include at least two vegetarian entrees, unless an exception is authorized in advance by Mykonos Headquarters

- Positive Example

2 Vegetarian Entrees: It is obligatory that each menu include at least two vegetarian entrees

Enforcement level: pre-authorized

Examples of Enforcement Levels

The following tables from the Business Motivation Model shows possible ranges of enforcement levels from “strictly enforced” to “guideline”

Value	Meaning
strictly enforced	If the rule is violated, the penalty is always applied..
deferred enforcement	Strictly enforced, but enforcement may be delayed — e.g., waiting for resource with required skills.
pre-authorized override	Enforced, but exceptions allowed, with prior approval for actors with before-the-fact override authorization.
post-justified override	If not approved after the fact, you may be subject to sanction or other consequences.
override with explanation	Comment must be provided when the violation occurs
guideline	Suggested, but not enforced.



Separating Enforcement Levels from Rule Statements

- Advantages of separating enforcement levels from rule statements:
 - ◆ enforcement level of a rule usually change more often than the rule itself
 - ◆ a rule can have different enforcement levels for different parts of the organisation
 - Example: As there are mor vegetarians in California than in Texas, The Mykonos management might decide to set the enforcement to strict for California restaurants and to override for restaurants in Texas.
- Enforcement levels influence behaviour rather than control it
 - ◆ A strictly enforced constraint that is violated means "Error"
 - ◆ A guideline that is violated means "Warning"

Rule Violations

- A business rule is said to be violated, when an event or state occurs that should not, according to the rule.
- An operative rule can be violated – a structural rule can not
- Examples:

No Checks: It is prohibited that a payment employ a personal check

Vegetarian Menu Items B: It is possible that a vegetarian menu includes an ingredient only if the ingredient is not meat or the ingredient is not fish

- Enforcement levels influence behaviour rather than control it
 - ◆ A strictly enforced constraint that is violated means "Error"
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Directly Enforceable Rules

- A rule is directly enforceable if someone who sees some behavior can decide whether the rule is violated

- Example:

- ◆ This rule is not directly enforceable

Nonrule 1: It is obligatory that the gratuity is at least 15% if the gratuity is applied to a bill and the bill is incurred by a party and the party is large.

- ◆ This rule is directly enforceable

Large party gratuity: It is obligatory that the gratuity is at least 15% if the gratuity is applied to a bill and the bill is incurred by a party and the party is greater than 7 people.

Alternatively, the noun concept large party could be defined as a party with 7 or more people

What should a Rule say?

- Business Rules should be concerned only with the conditions that must apply in a defined state
- In particular, a business Rule should define what should be the case and should **not** prescribe
 - ◆ *Who* invokes the rule
 - This is usually described in a use case or a process description
 - ◆ *When* the rule is executed
 - This is usually described in a business event, use case or a process description
 - ◆ *Where* the rule executes
 - This will be defined in the design
 - ◆ *How* the rule is implemented
 - This will be defined in the design