Software Engineering within a Digital Business Ecosystem

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Outline

1. Natural language software specification
2. An ecosystem of companies and components
3. Code generation
4. Synchronization of specification from adapted software
Standard current practices (UML) drop very soon below the level of understanding of the customers, contrarily to natural language based techniques (SBVR).
According to the vision of the Object Management Group, SBVR is the language of choice for Computational Independent Models in the Model-Driven Architecture.
SBVR model example

**branch**
- Concept Type: organization function
- Definition: rental organization unit that has rental responsibility

**car movement**
- Definition: planned movement of a rental car of a specified car group from a sending branch to a receiving branch

**receiving branch**
- Concept Type: role
- Definition: branch that is the destination of a car movement

**sending branch**
- Concept Type: role
- Definition: branch that is the origin of a car movement

**car movement has receiving branch**
- Necessity: each car movement has exactly one receiving branch

**car movement has sending branch**
- Necessity: each car movement has exactly one sending branch

**rental car is assigned to car movement**
- Necessity: At most one rental car is assigned to each car movement

**car movement being international**
- Concept Type: characteristic
- Definition: car movement having country of sending branch that is not the country of receiving branch of the car movement.
Service Oriented Architecture with a Digital Ecosystem

SBVR decomposition
digital ecosystem
developer
automatic composition
software
Some implementor finds the request and offers to develop it;

several components existing in the digital ecosystem can be re-used to satisfy the request and the additional parts necessary are developed by some implementors;

all the necessary components are already in the digital ecosystem and only fine-grained optimization prior to deployment needs to be done.
Levels of automation

- Decompose the request/specification in atomic units;
- match the atomic components to the ones available;
- offer the best solutions to the requester;
- combine the components to satisfy the request;
- open bids for developers to implement missing components.
In Zachman Framework terms

- From row 2, the conceptual business model, to row 3, the logical system model.
From SBVR models to UML class diagrams and code

Example from ruleset for transformation of unary fact types (characteristics).
Re-adaptation of specification

Round-trip engineering with SBVR

- An SBVR model is created;
- the corresponding UML models are generated;
- code is generated from the annotated UML models;
- UML models or the source code are modified;
- the original SBVR model is updated with the modification.
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