Model based DSL Frameworks

Claim

MDA —generalise→ MDE —generalise→ DSL

MDA: model driven architecture

MDE: model driven engineering

Concepts

MDE (model driven engineering)

> Traditionally, models have been used as initial design sketches mainly aimed for communicating ideas among developers.
>
> MDE promotes models to primary artefacts that drive the whole development process.
>
> The notion of model goes beyond the narrow view of semi-formal diagram thus requiring much more precise definitions and modelling languages.

λ-models

this concept belongs to the Concept Technical Space

different from conceptal models, λ-models are models interpreted in some platform, language or other concrete forms, such as, XML, UML, Java.

Principles, Standards and Tools

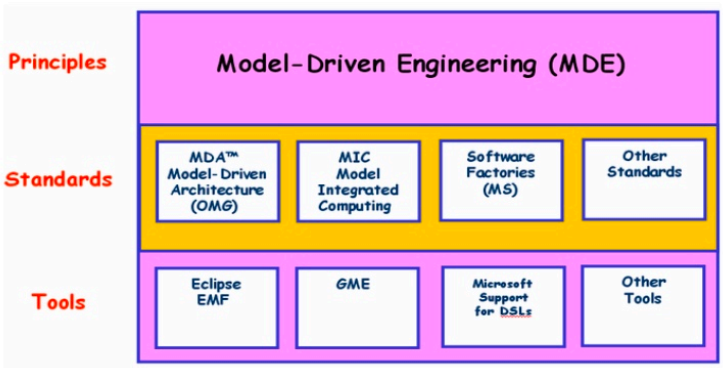


Figure 1. Principles, Standards, and Tools

Model Ognization

- Directed Multigraph

Edges (these are actually labels of arrows)

$$G = (N_G, E_G, \Gamma_G)$$

nodes

$$\Gamma_G : E_G \longrightarrow N_G \times N_G$$

each arrow can have multiple labels

- Model

directed multigraph

reference model associated with $G_w = (N_w, E_w, \Gamma_w)$

conformance function $\mu : N_G \cup E_G \longrightarrow N_w$

defines how M and w are associated

$$M = (G, w, \mu)$$

* language engineering

Orginization of models

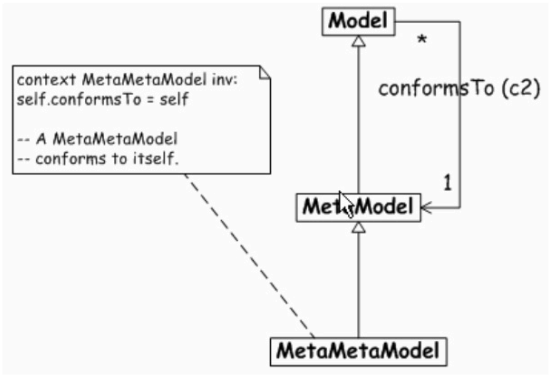


Figure 2. General organization of a metamodeling stack

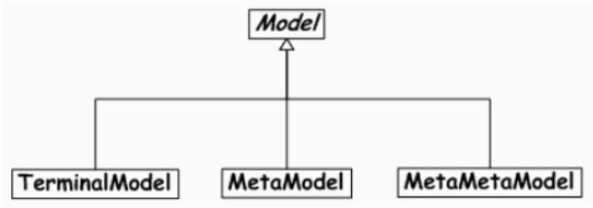
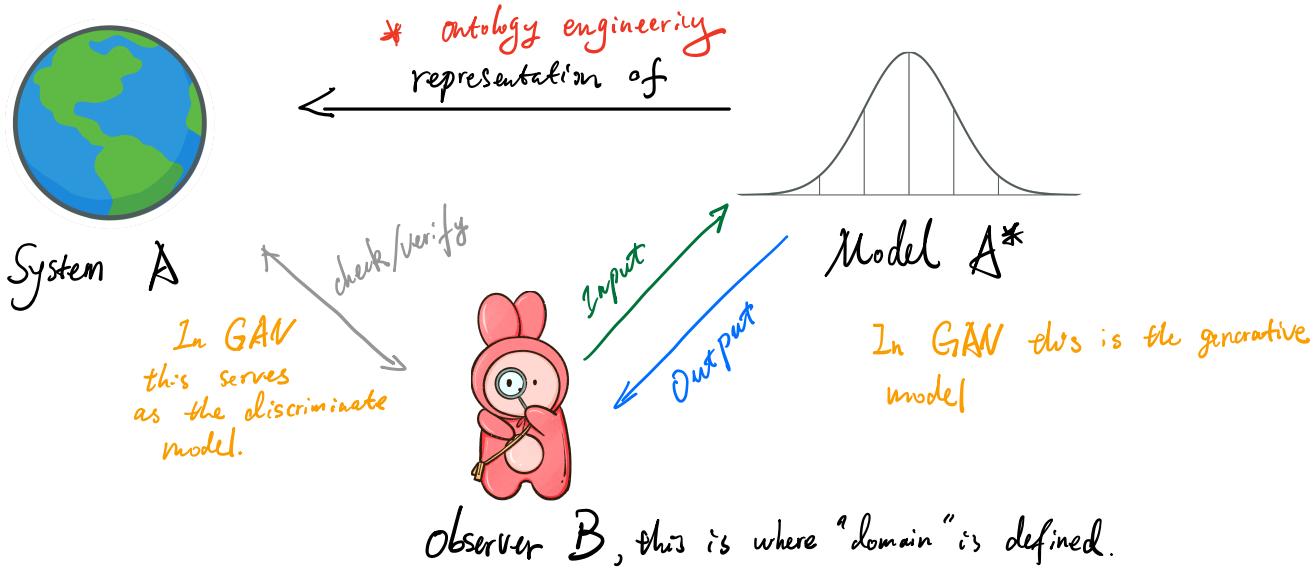


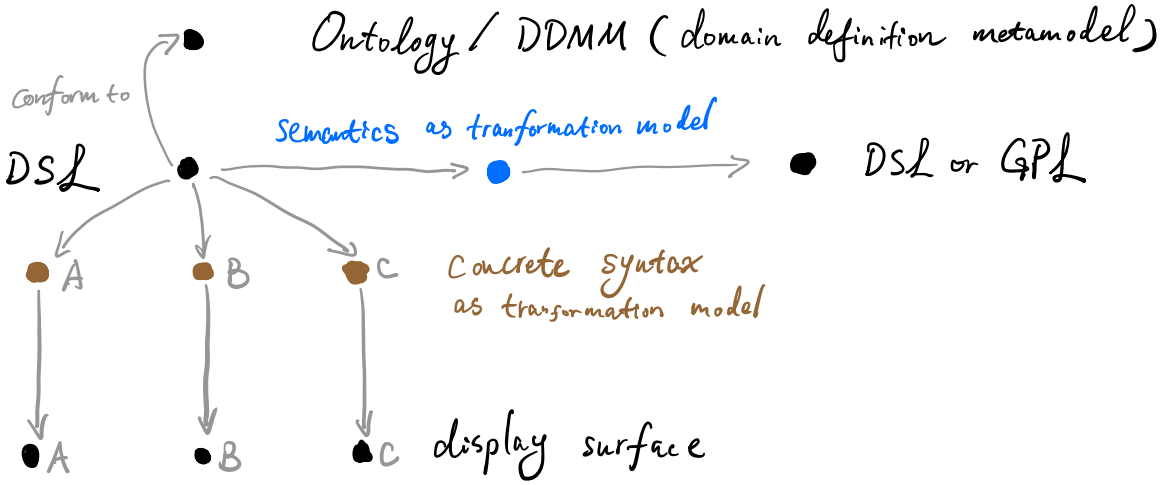
Figure 3. Classification of models as terminal models, metamodels, and metametamodels

What is a Model?

We use the term "model" in the following sense: To an observer B, an object A* is a model of an object A to the extent that B can use A* to answer questions that interest him about A



Using model based solutions for defining Syntax and Semantics of DSL



Common Problems :

Table 1. Problems exemplified in different case studies

		Case Studies					
		Telephony Languages	Querying Source Code	PIM to PSM Transformation	Sensor Data Stream Processing	Bug Tracking	Contract Management
Problems	Semantics interoperability	X				X	X
	Heterogeneous syntaxes		X			X	X
	Uniform representation framework		X		X		
	Flexible transformations between languages			X			
	Metadata management				X	X	X
	Volume scalability		X		X	X	
	Tool reusability						X
	Querying heterogeneous data		X				
	Product and Process combination					X	X