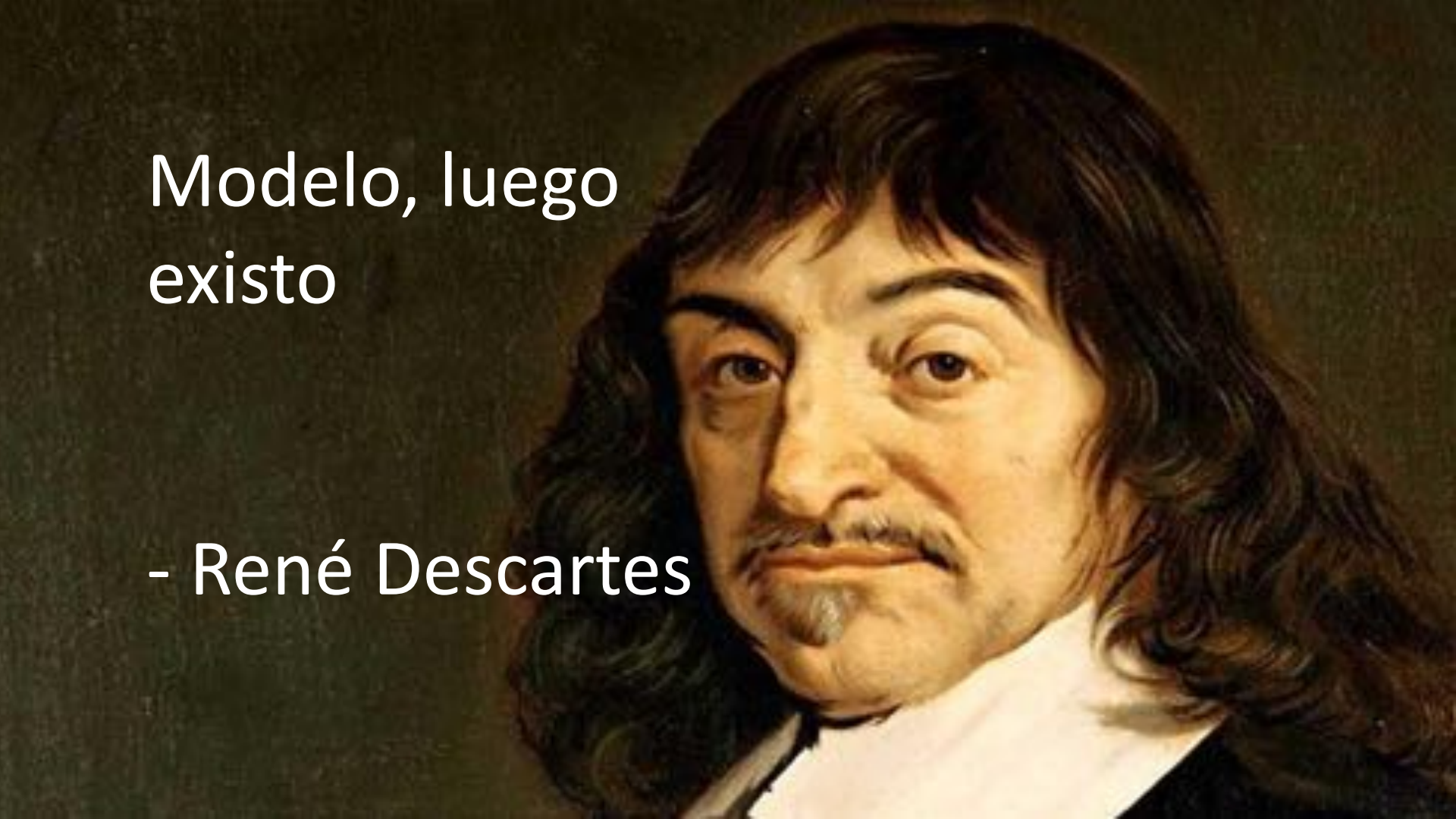

Modelo, luego existo
- René Descartes

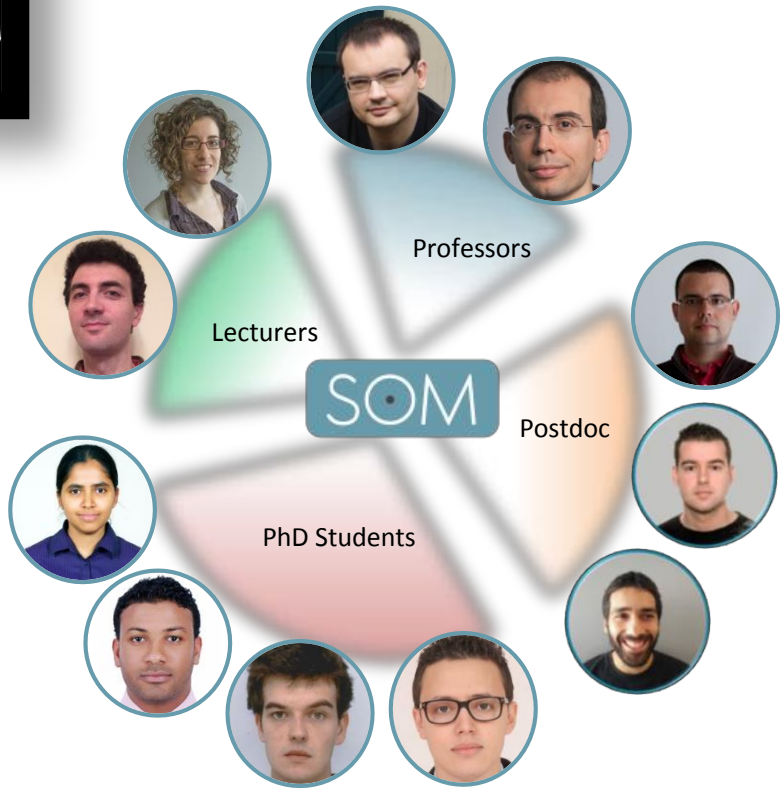
Ingeniería del Software dirigida por modelos

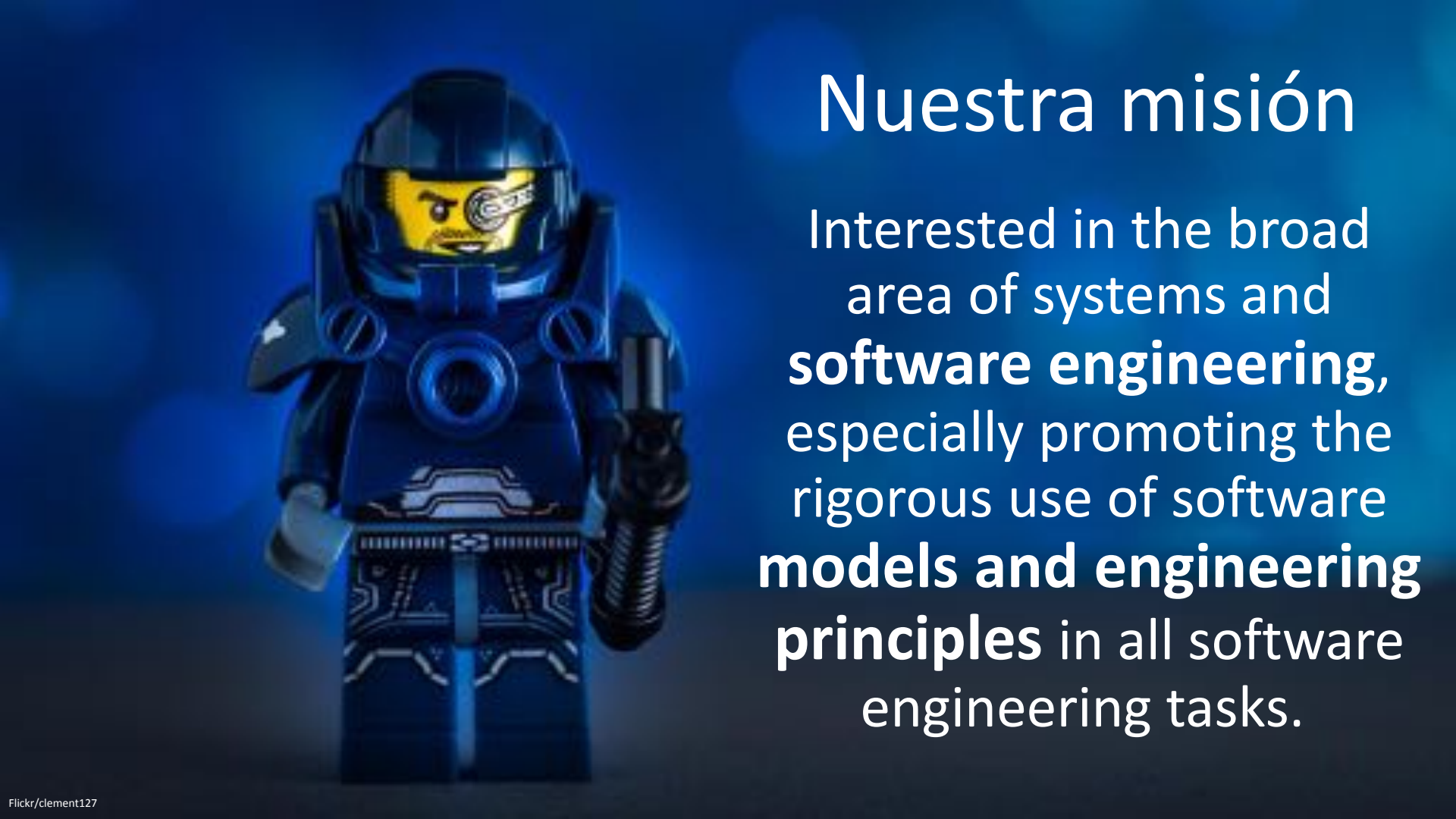
Versión para incrédulos

Jordi Cabot – ICREA Research Professor at UOC


SOM Research Lab
Software runs the world. Models run the software

El equipo



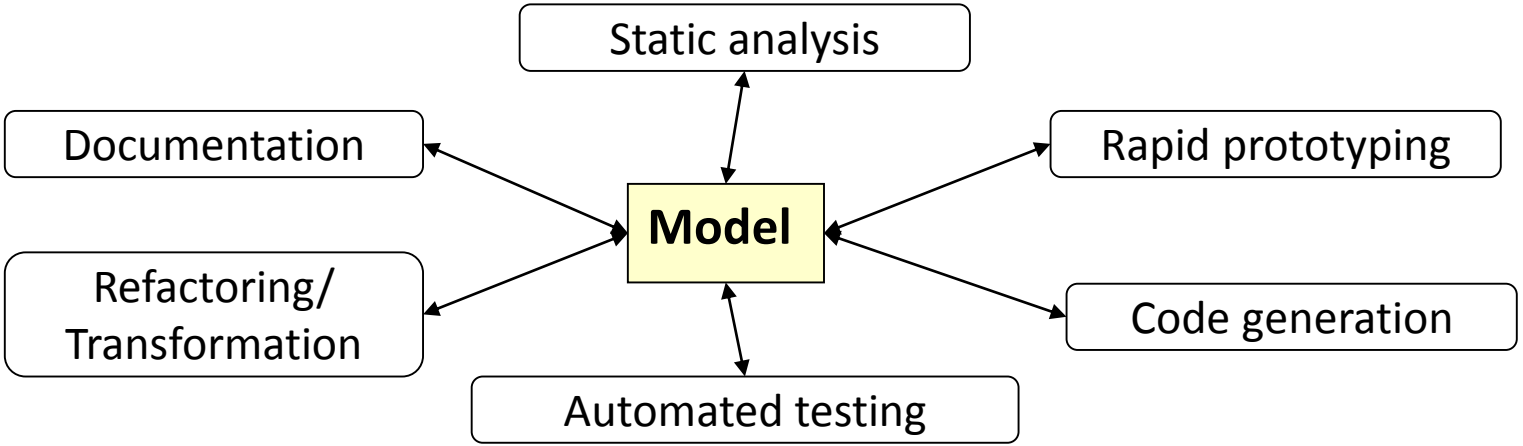


Nuestra misión

Interested in the broad area of systems and **software engineering**, especially promoting the rigorous use of software **models and engineering principles** in all software engineering tasks.

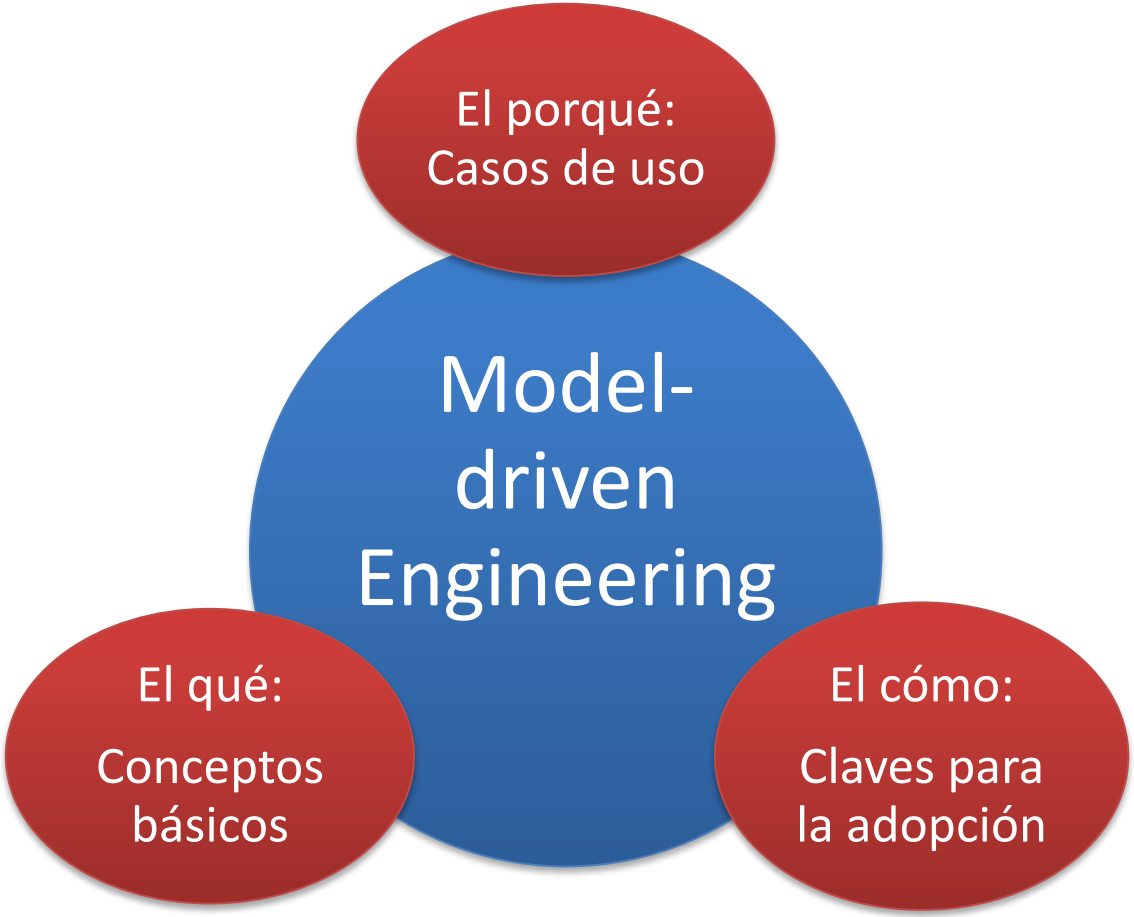
Flickr/clement127

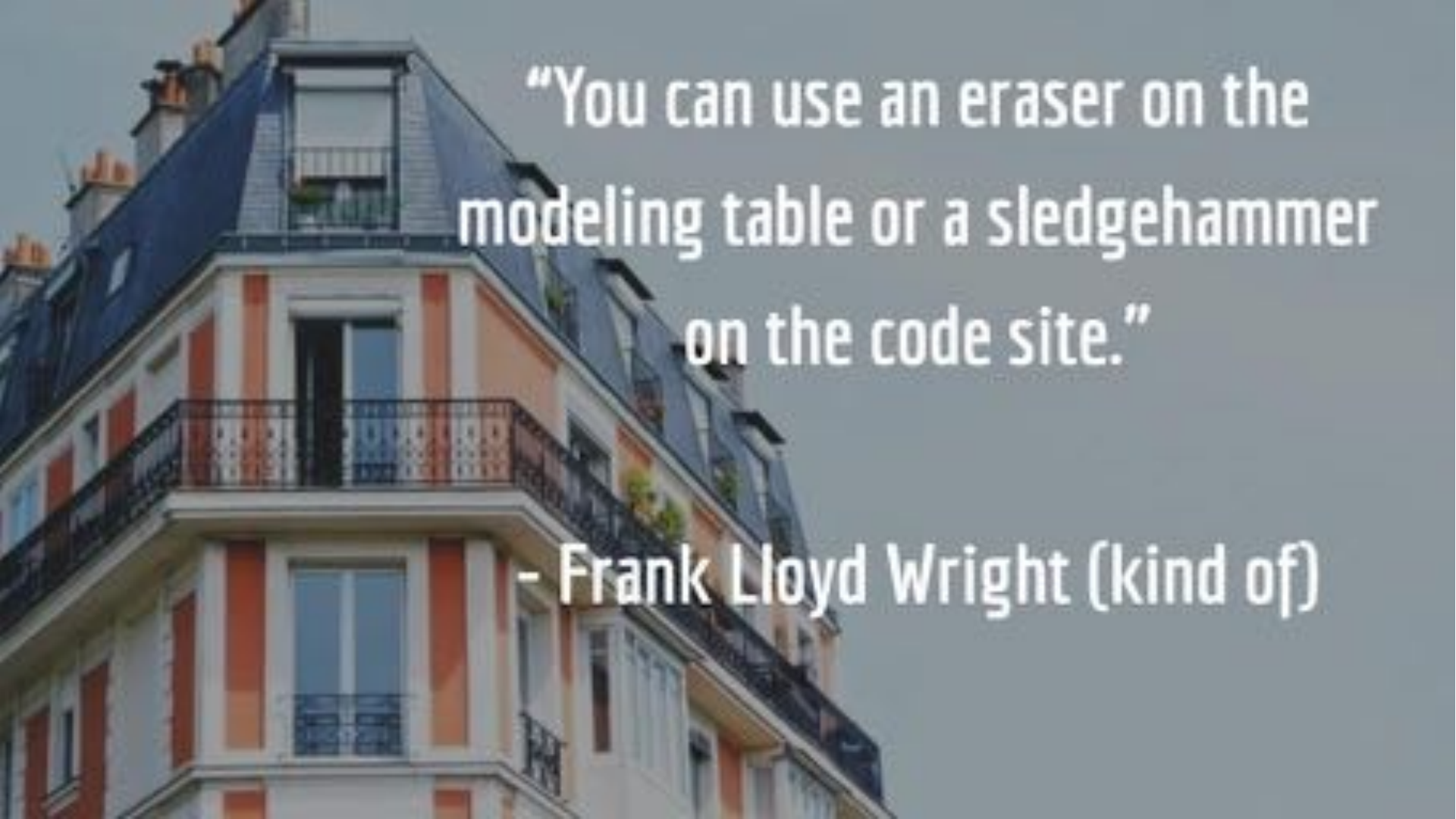
IDM = Modelos como parte central de la Ingeniería del Software

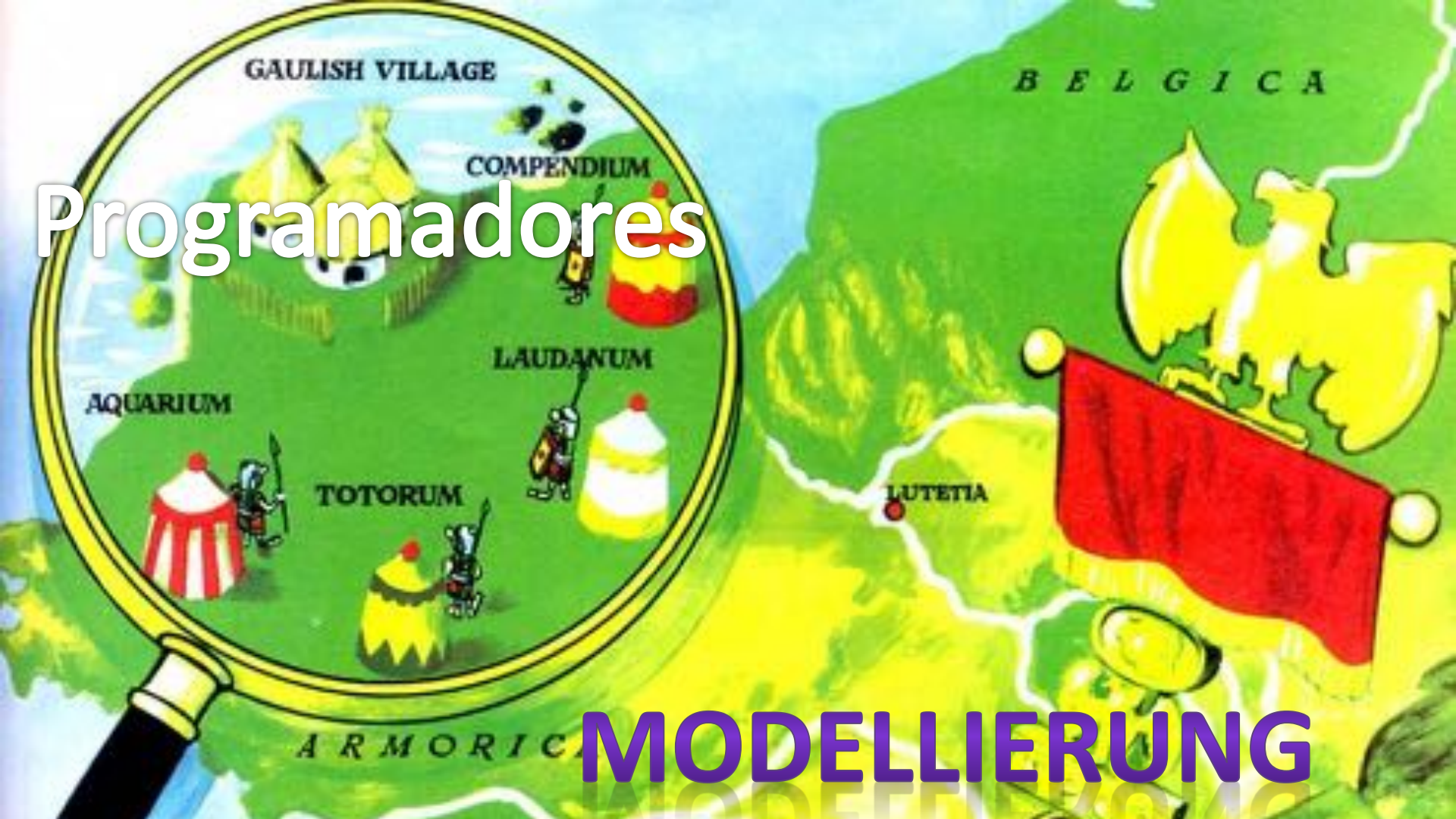


[Illustration by Bernhard Rumpe]


Modelas y punto!!!

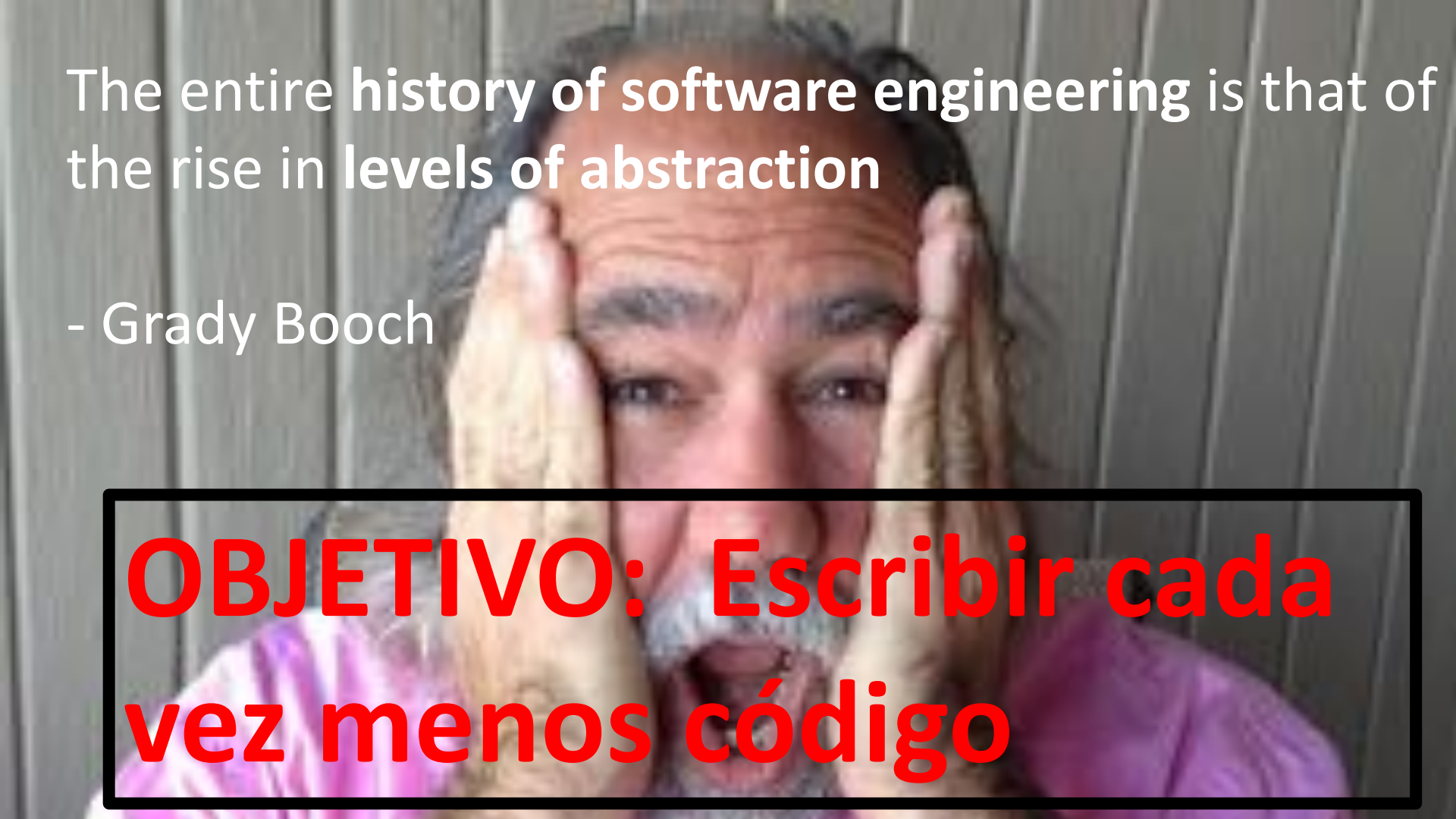

El porqué:
Casos de uso
Model-driven Engineering
El qué:
Conceptos básicos
El cómo:
Claves para la adopción


"You can use an eraser on the modeling table or a sledgehammer on the code site."
- Frank Lloyd Wright (kind of)



Programadores

MODELLIERUNG


The entire **history of software engineering** is that of the rise in **levels of abstraction**
- Grady Booch
OBJETIVO: Escribir cada vez menos código


Symfony


django


YEOMAN

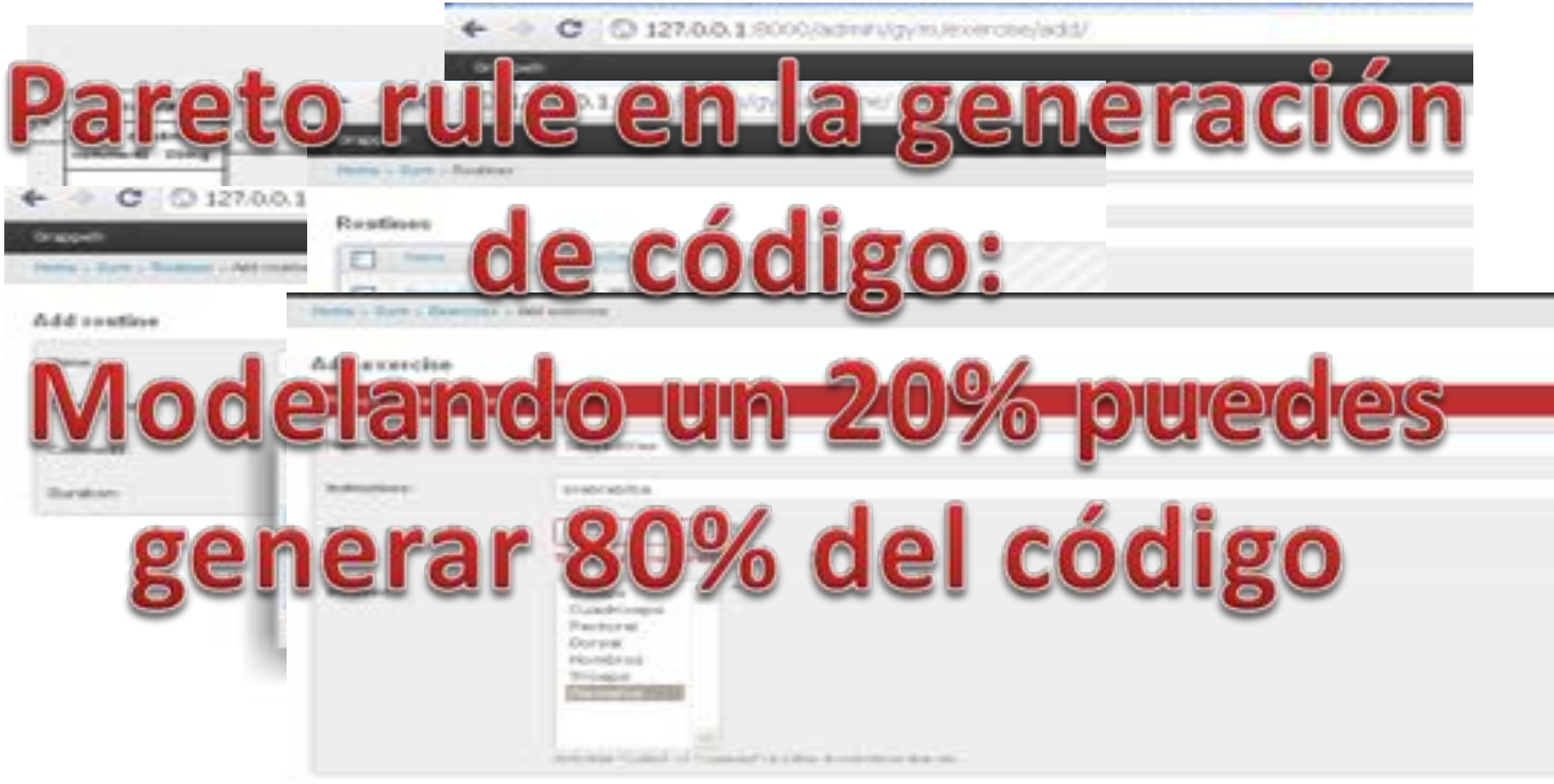

RAILS

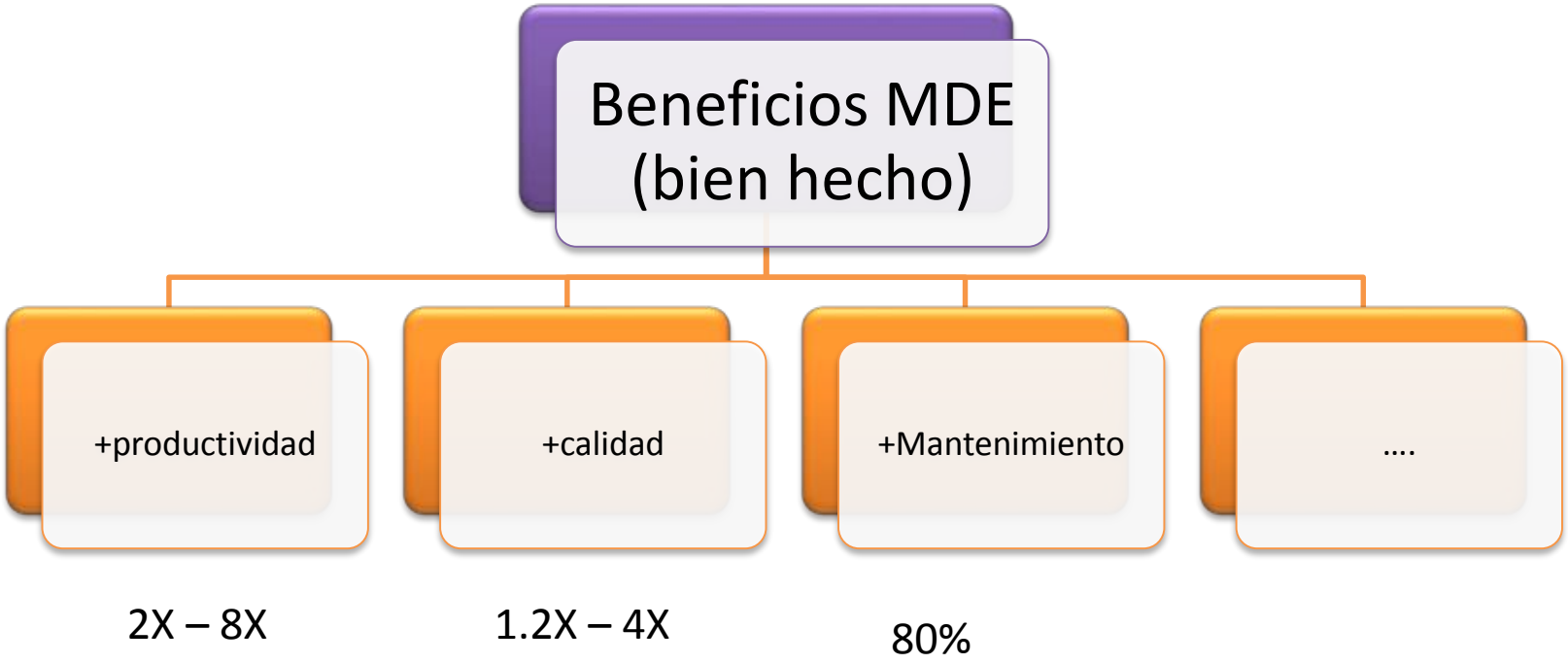

GRAILS


METEOR
THE FASTEST WAY TO BUILD APPS

MDE es la formalización (culminación?) de este proceso

(common-sense) code generation



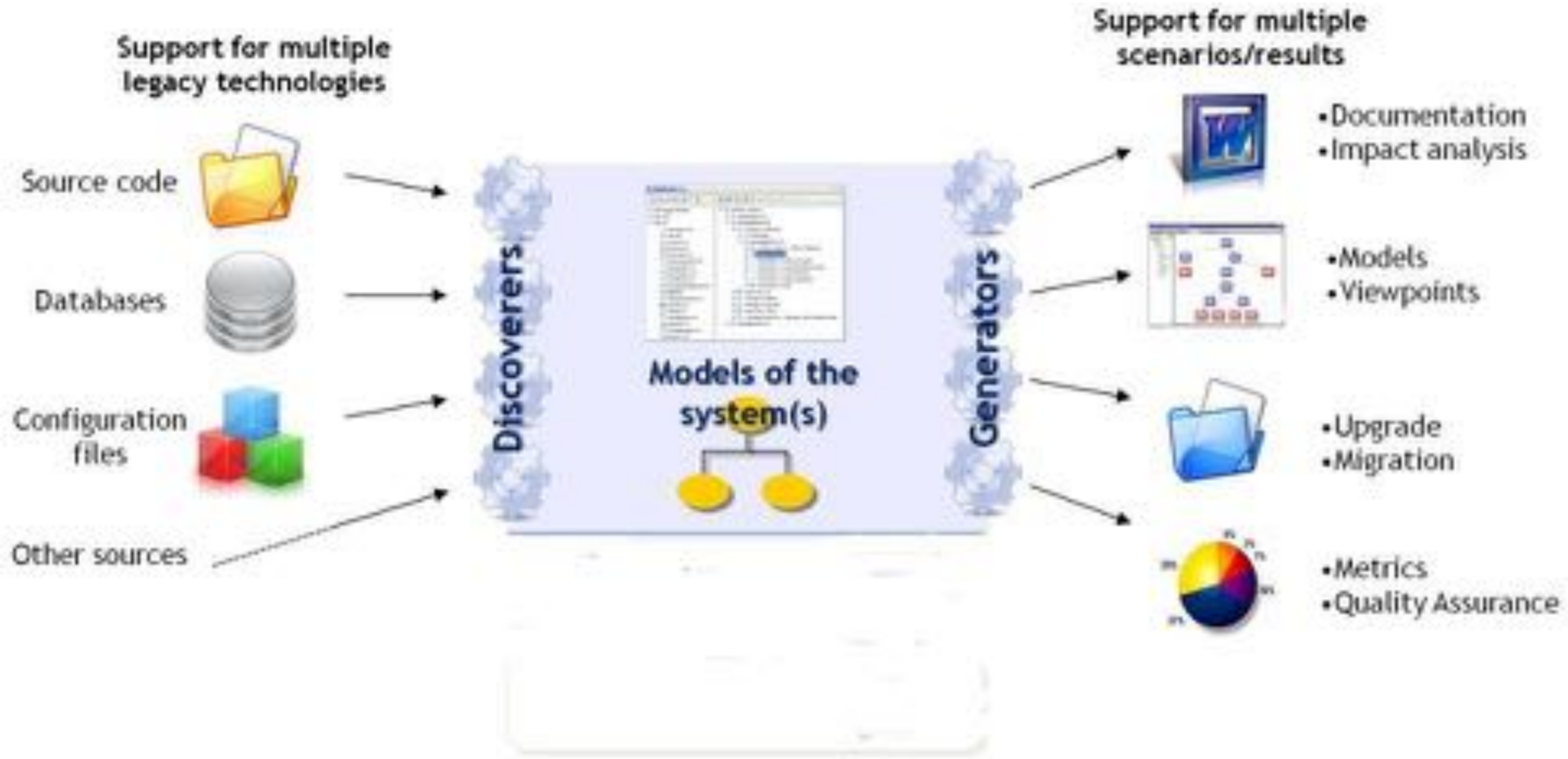

Beneficios MDE
(bien hecho)
+productividad
+calidad
+Mantenimiento
….
2X – 8X
1.2X – 4X
80%

MDE es >> que generación de código

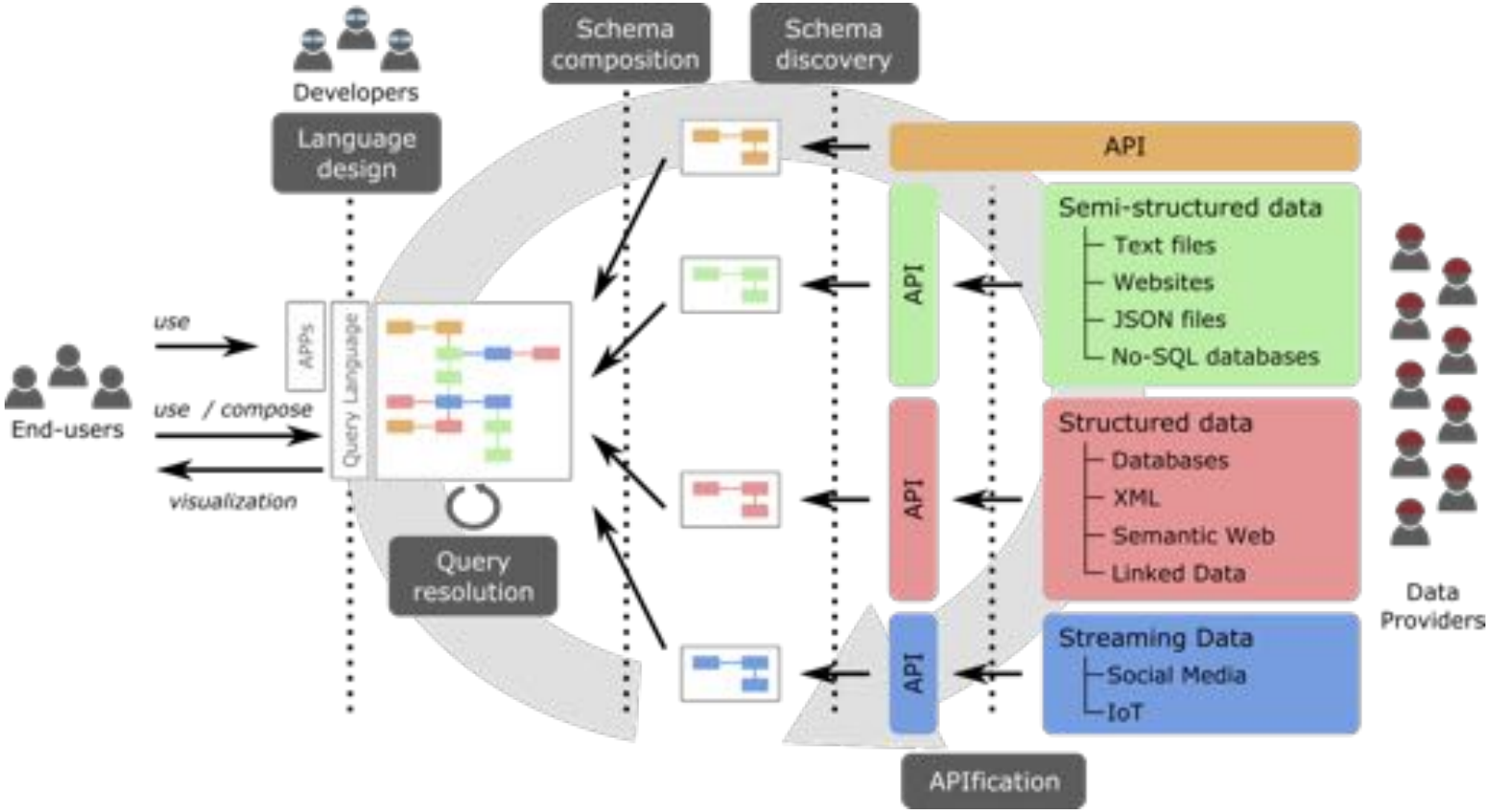
MDD
(software
development)

MDE
(software
engineering)

MDE es modernización de Software



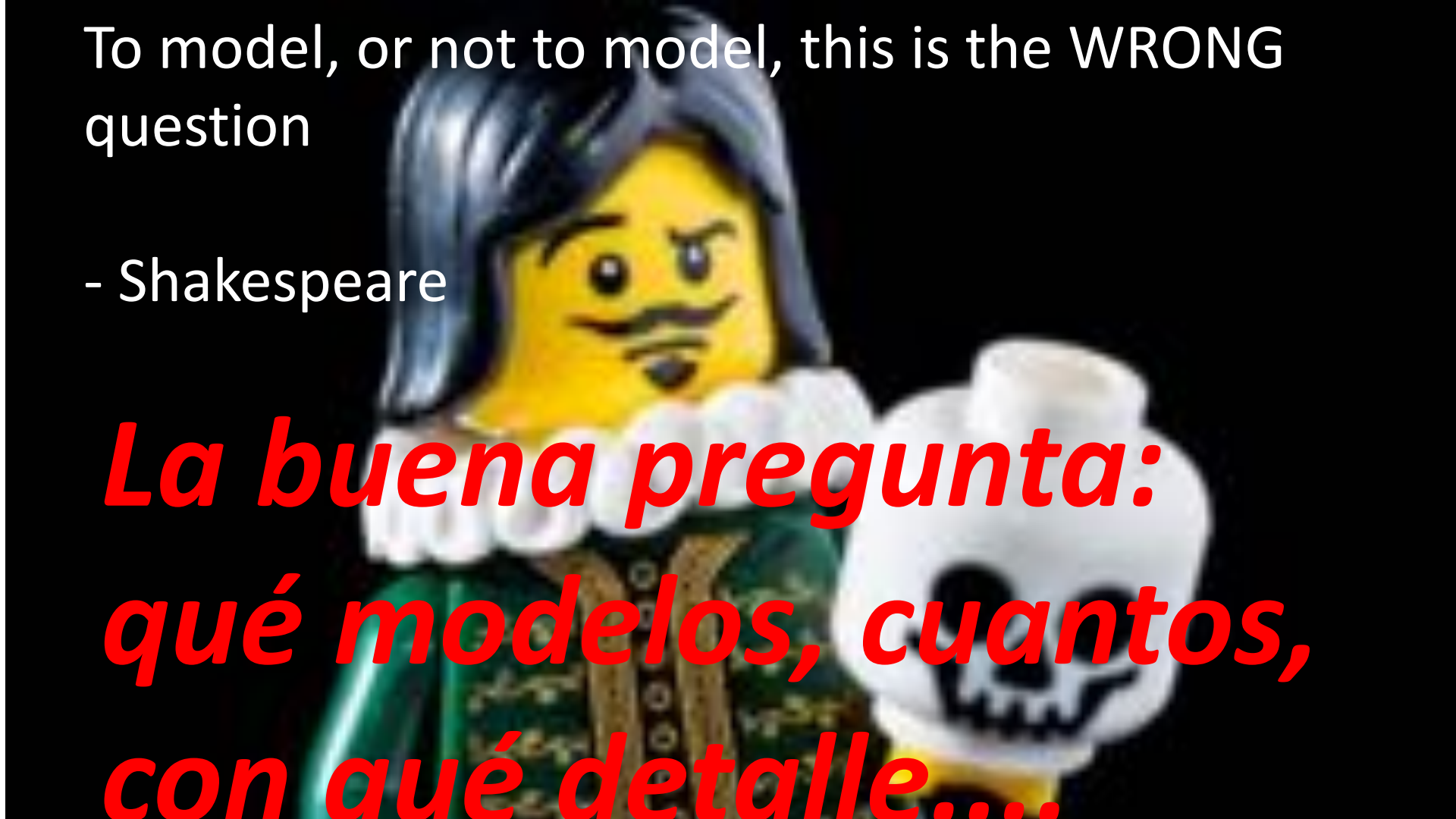
MDE es Open Data




What If I
told you
MODELS
ARE
COMING!!!

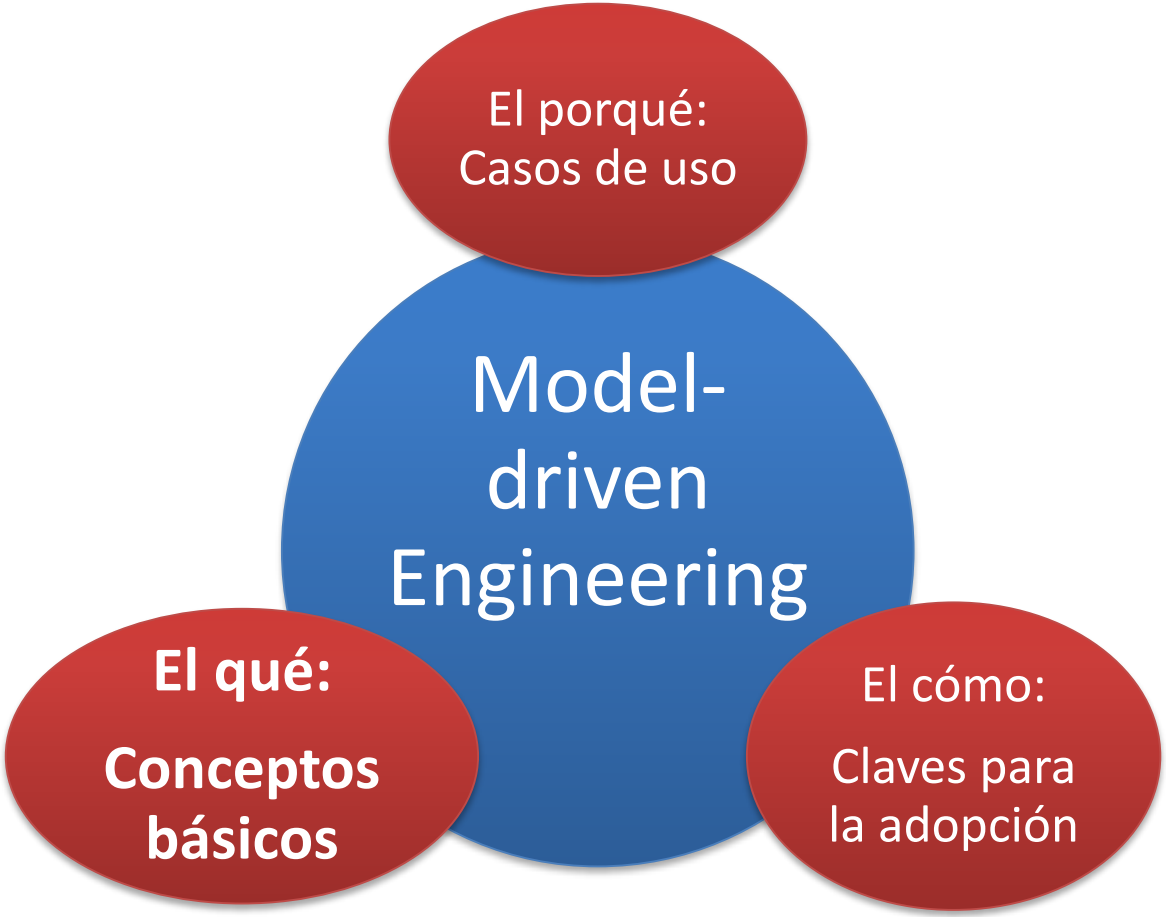
To model, or not to model, this is the WRONG question

- Shakespeare



La buena pregunta: qué modelos, cuantos, con qué detalle...


Modelling
illiterate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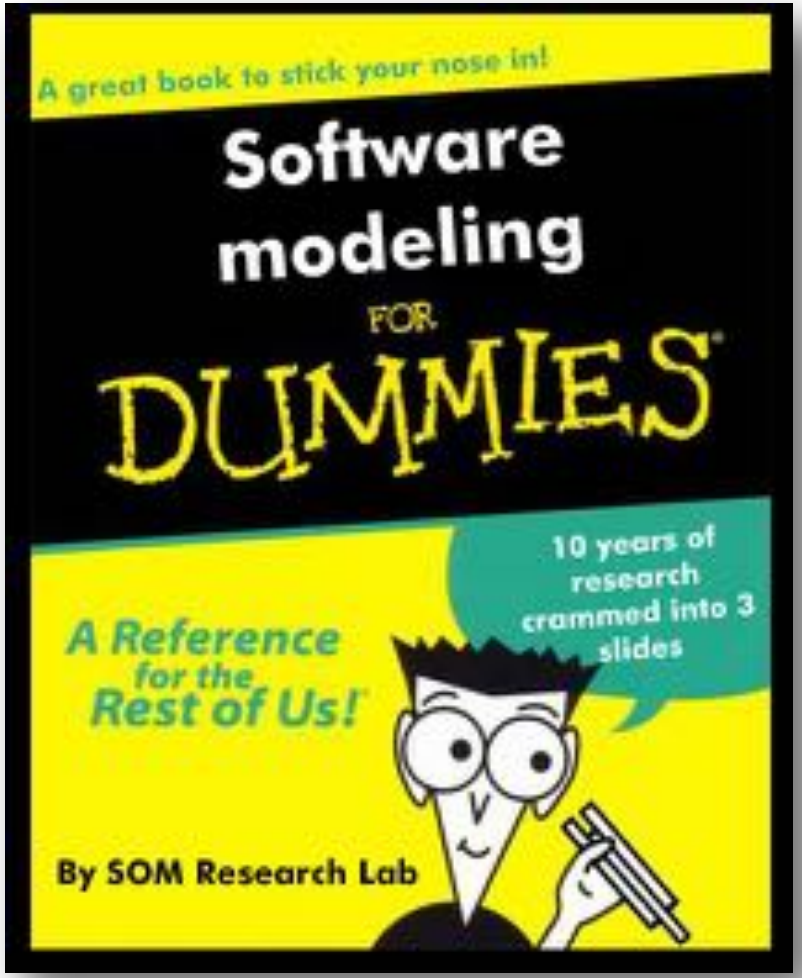
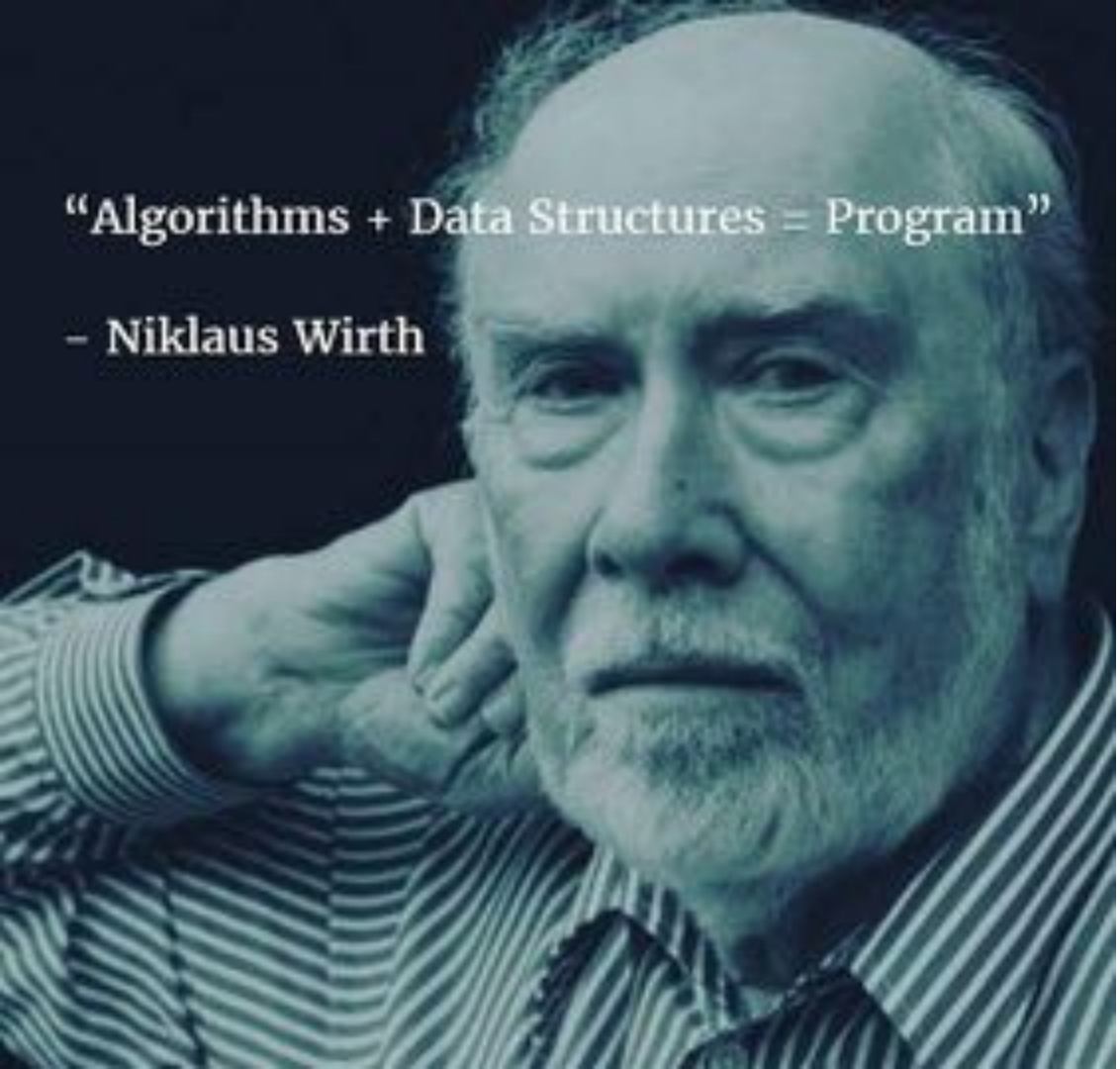
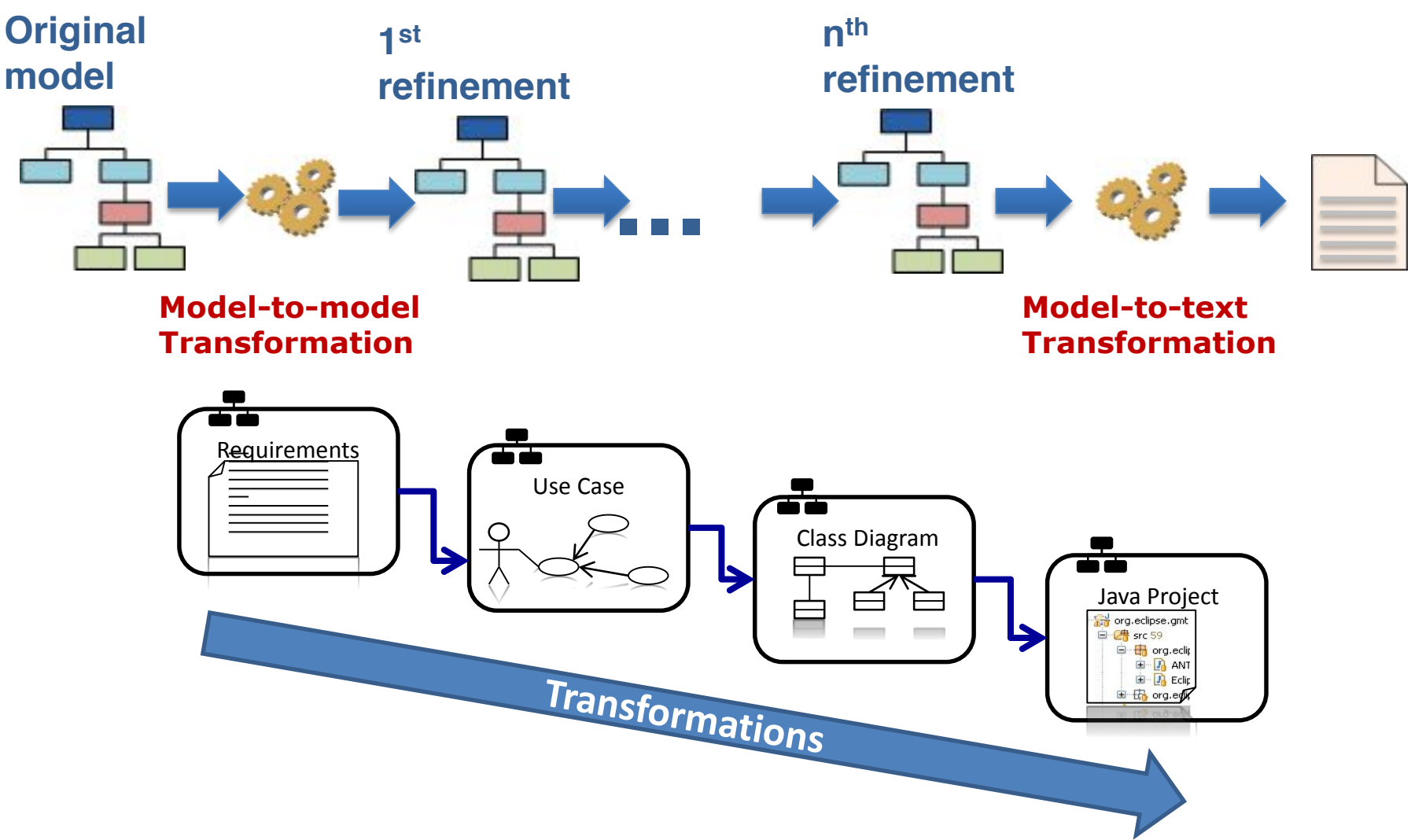
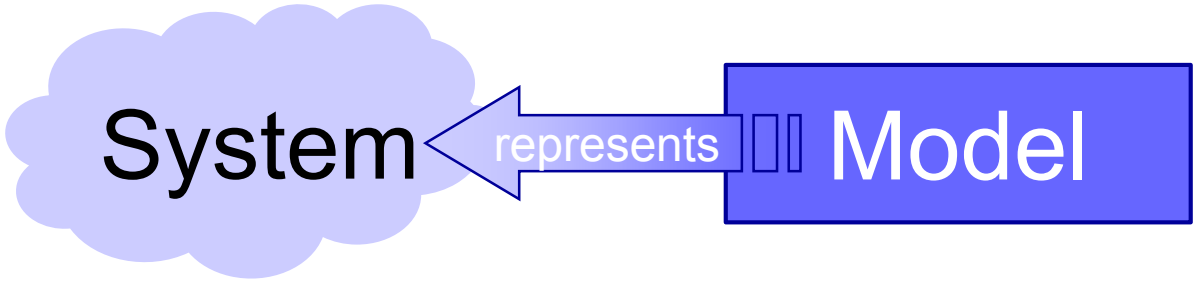

A great book to stick your nose in!
Software modeling
FOR
DUMMIES
A Reference for the Rest of Us!
10 years of research crammed into 3 slides
By SOM Research Lab



La equación MDE: Models + Transformations = Software


Original model
1st refinement
nth refinement
Model-to-model Transformation
Model-to-text Transformation
Requirements
Use Case
Class Diagram
Java Project
Transformations

Qué es un modelo?



Mapping Feature	Un model se basa en el original (=system)
Reduction Feature	Un modelo refleja sólo las propiedades relevantes del original
Pragmatic Feature	Un modelo tiene que poder usarse en el original en un escenario concreto

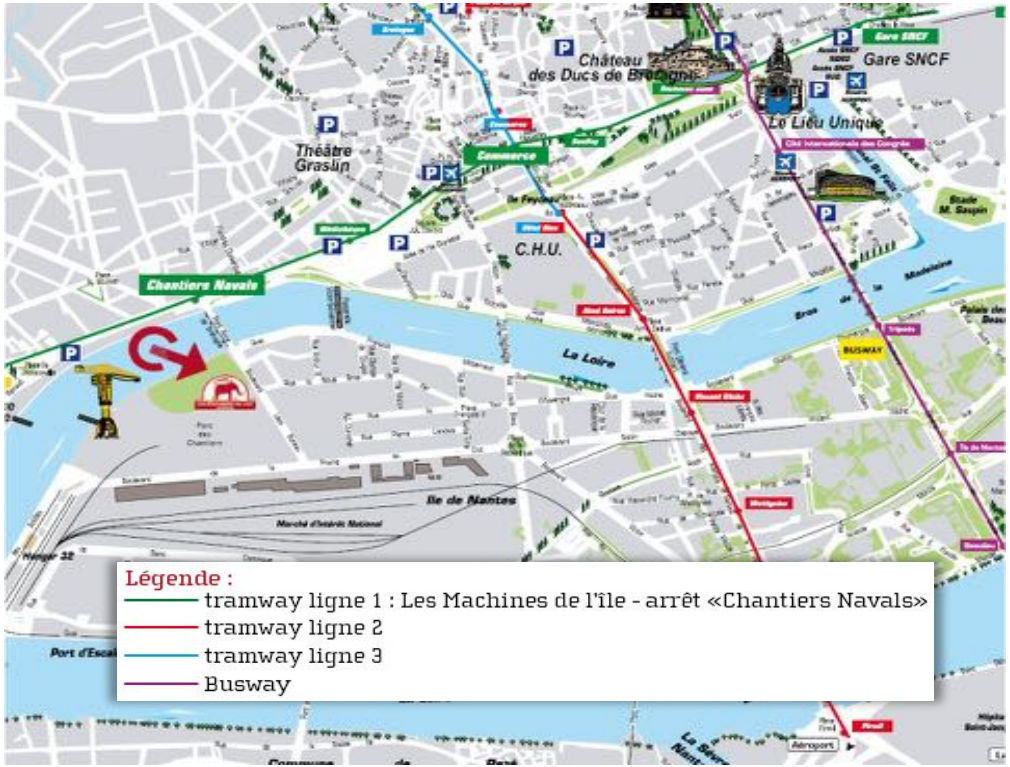
Un modelo

Ciudad de Nantes = “system” a modelar

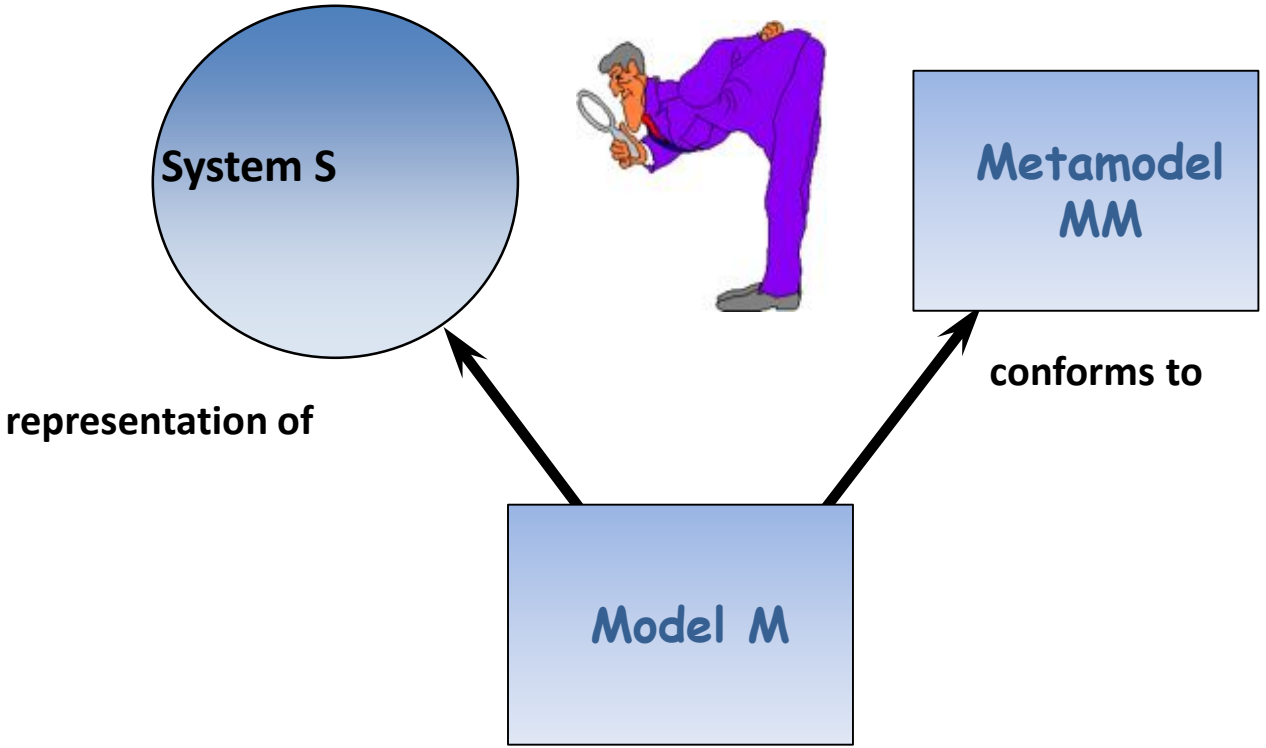
Un mapa es de hecho un modelo del sistema

La leyenda del mapa es la gramática / metamodelo

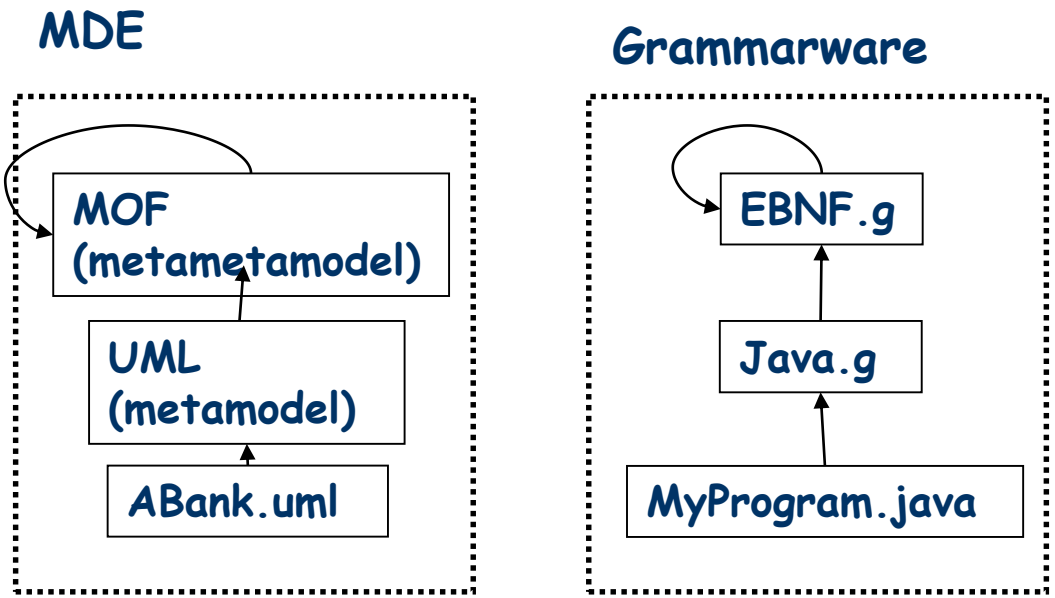
Existen diferentes tipos mapas: transporte, alcantarillado,… que dan “vistas” diferentes de la ciudad



Models & Metamodelos



Muy parecido al mundo de la programación

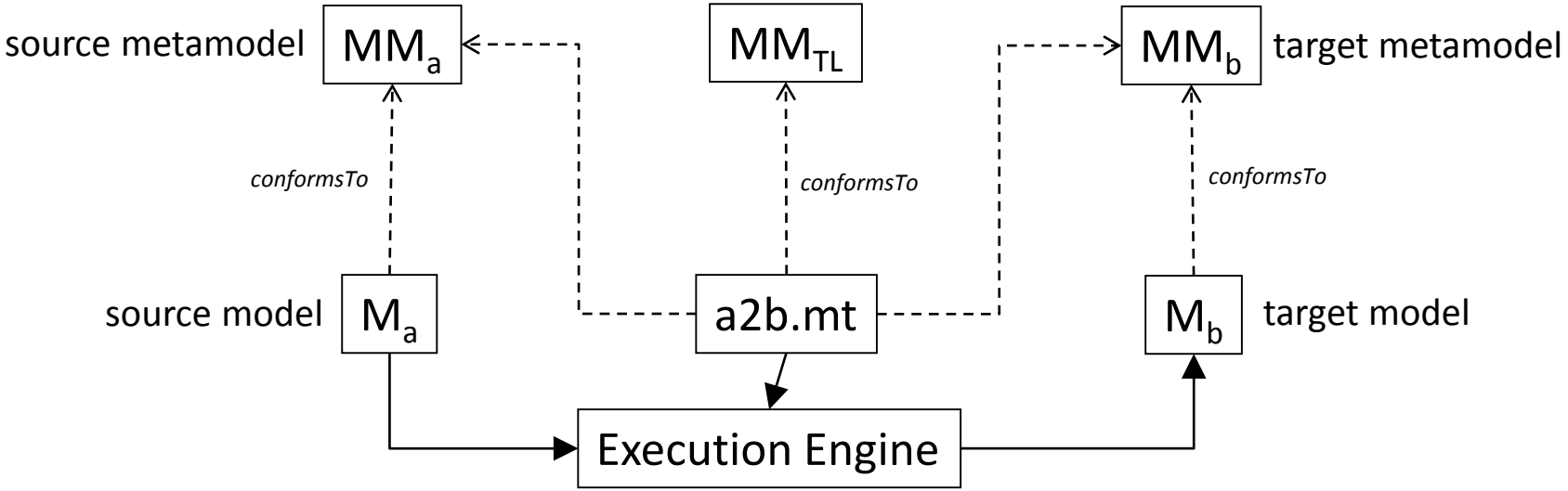


Qué lenguaje usar

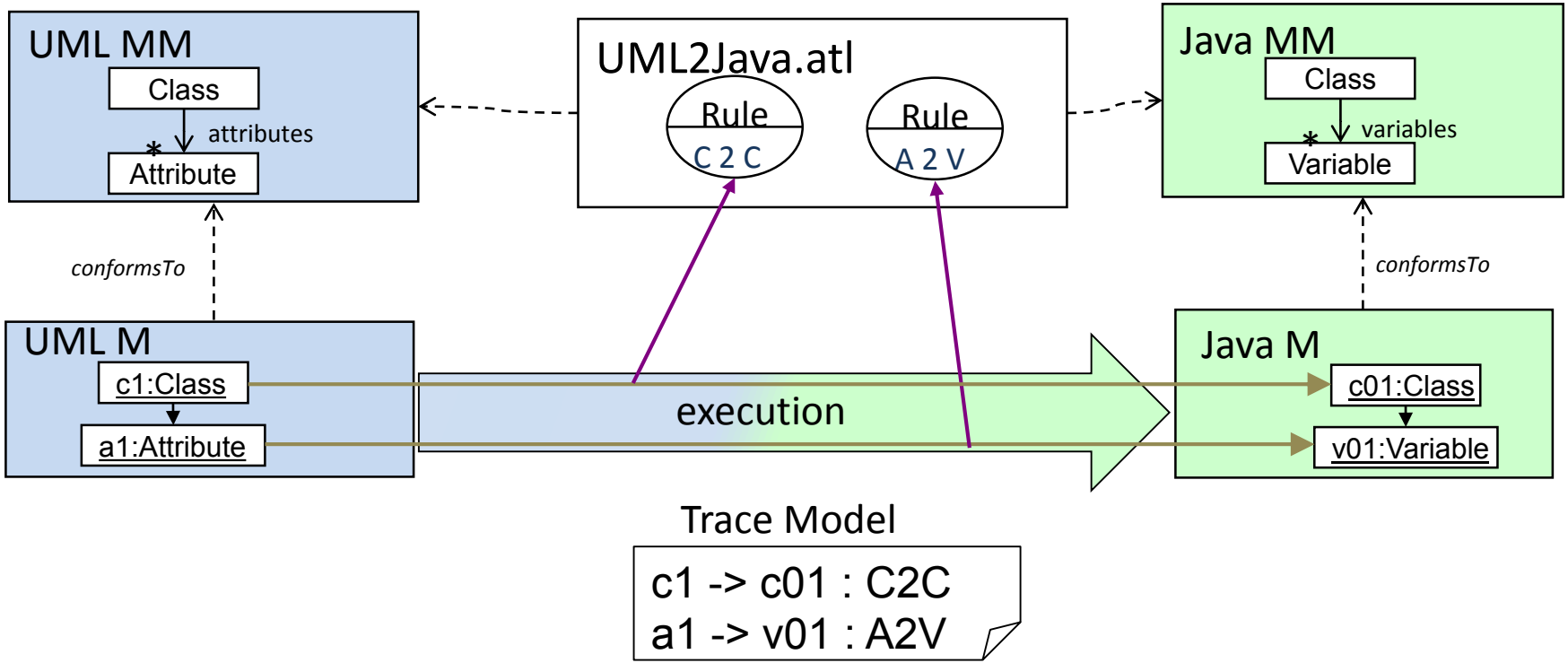
O construye tu propio Domain-Specific Language

Transformación de modelos

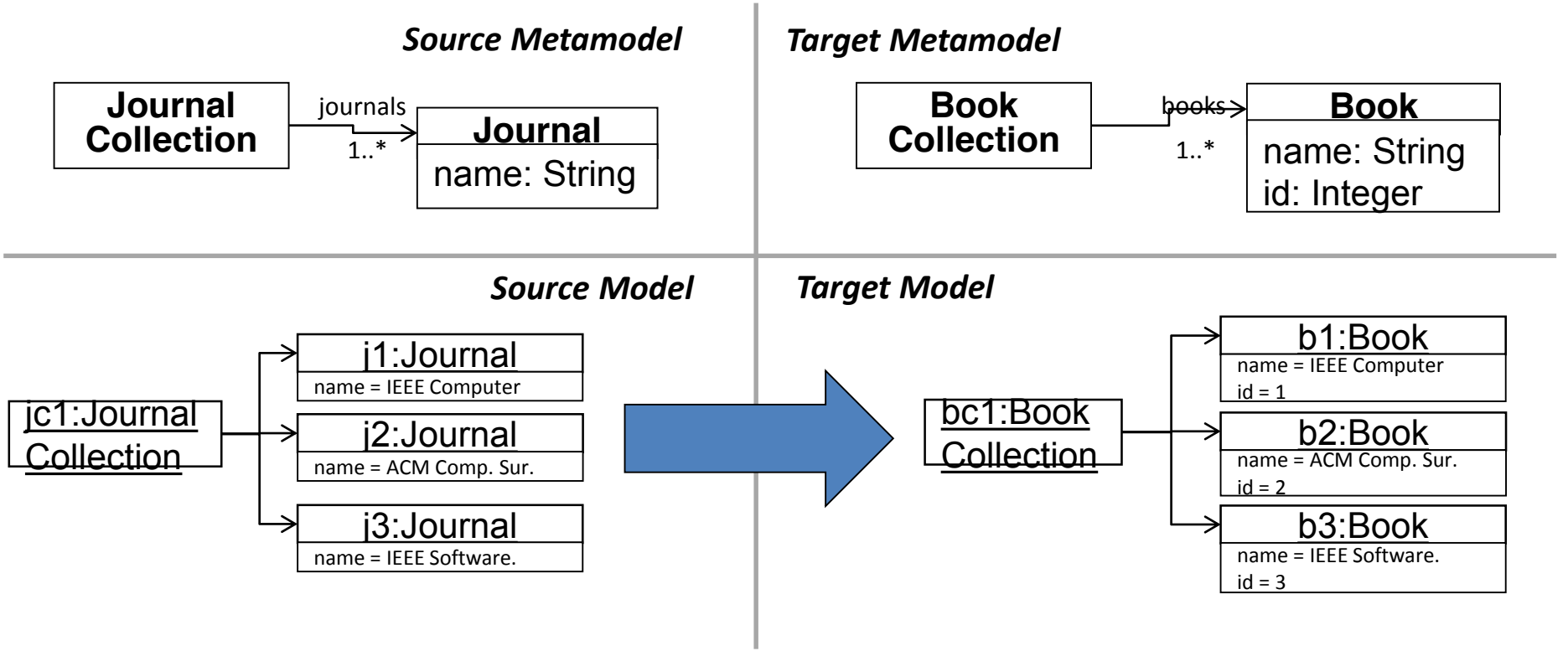
Model-to-Model Transformation Pattern

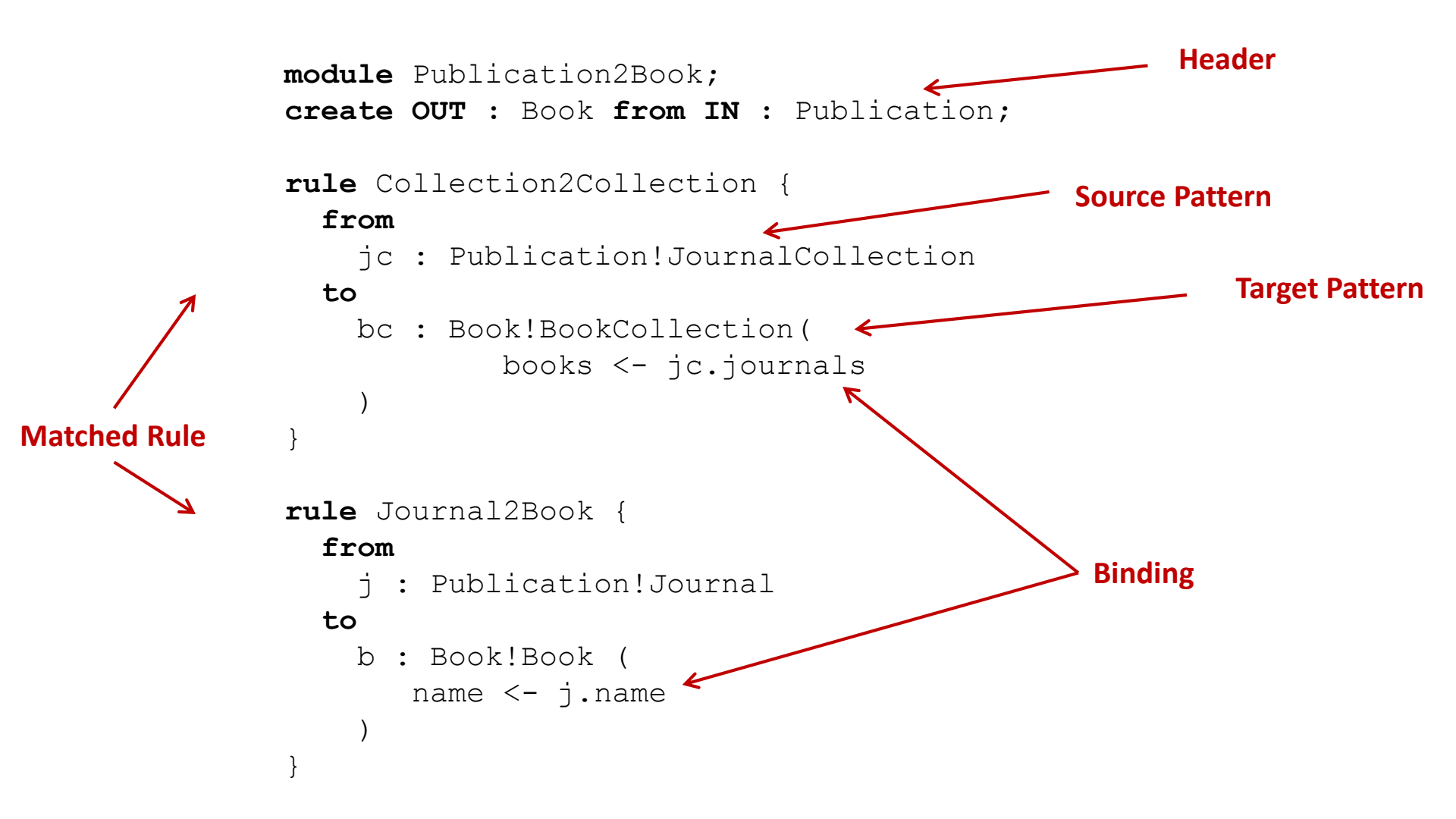


M2M Transformation example

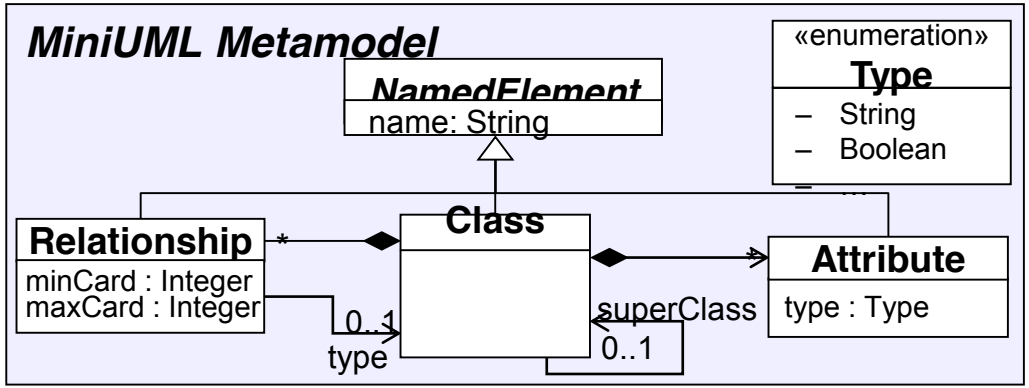


Example #1 – Publication 2 Book




module Publication2Book;
create OUT : Book from IN : Publication;
rule Collection2Collection {
from
jc : Publication!JournalCollection
to
bc : Book!BookCollection(
books <- jc.journals
)
}
rule Journal2Book {
from
j : Publication!Journal
to
b : Book!Book (
name <- j.name
)
}
Header
Source Pattern
Target Pattern
Matched Rule
Binding

Transformación modelo a texto



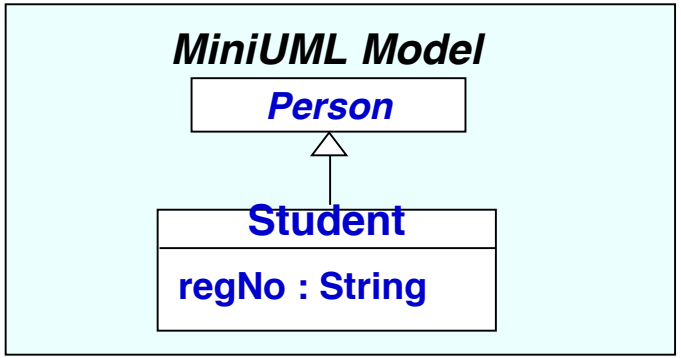
MiniJava Grammar

```
ClassDec := Modifier "class" Identifier ["extends"
            Identifier] ClassBody;

AttributeDec := Modifier Type Identifier";";

MethodDec := Modifier ReturnType Identifier "("
             ParamList ")" "{" MethodBody "}";

Identifier := {"a"-"z" | "A"-"Z" | "0"-"9"};
```

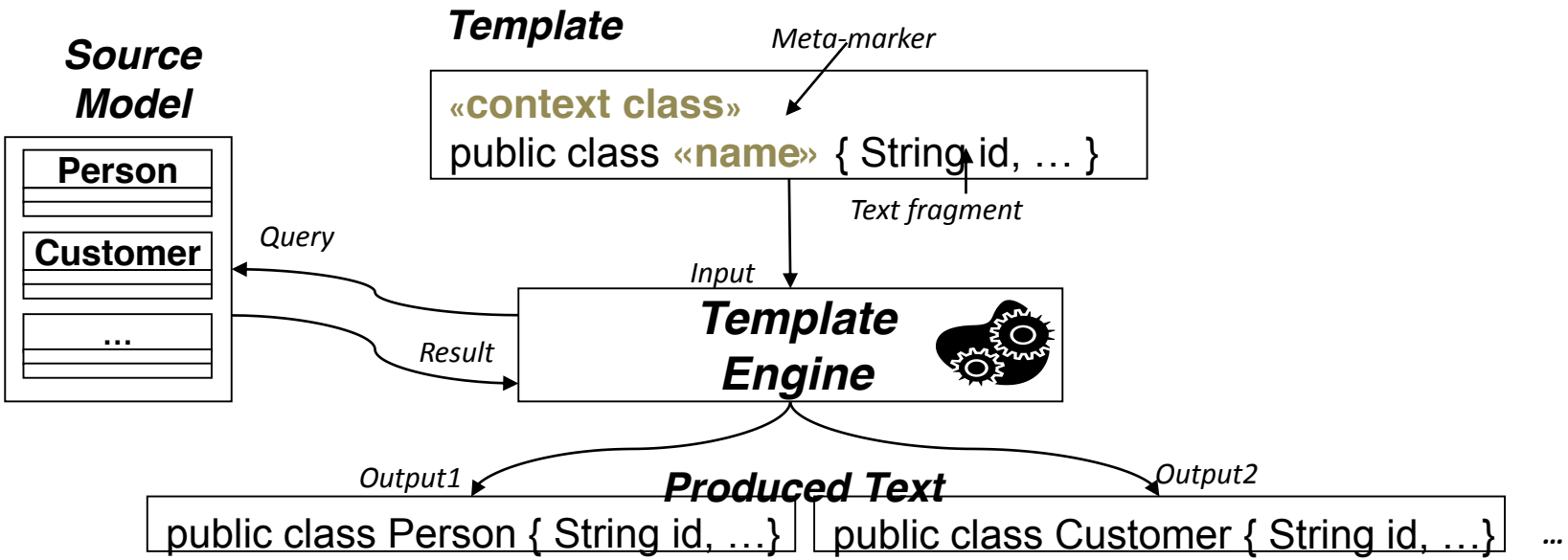


Model2Text

MiniJava Code

```
class Student extends Person{
  private String regNo;
  public void setRegNo(…){…}
  public String getRegNo(){…}
}
```

M2T : Motor de templates



Acceleo

```
[template public javaClass(aClass : Class)]

[file (aClass.name.toUpperFirst()+'.java', false, 'UTF-8')]
package entities;

import java.io.Serializable;

public class [aClass.name/] implements Serializable {

[for (att : Attribute | aClass.atts) separator ('\n')]
[javaAttribute(att)/]
[/for]

[for (op : Operation | aClass.ops) separator ('\n')]
[javaMethod(op)/]
[/for]

}
[/file]
[/template]
```

Open output file

Static Text

Query

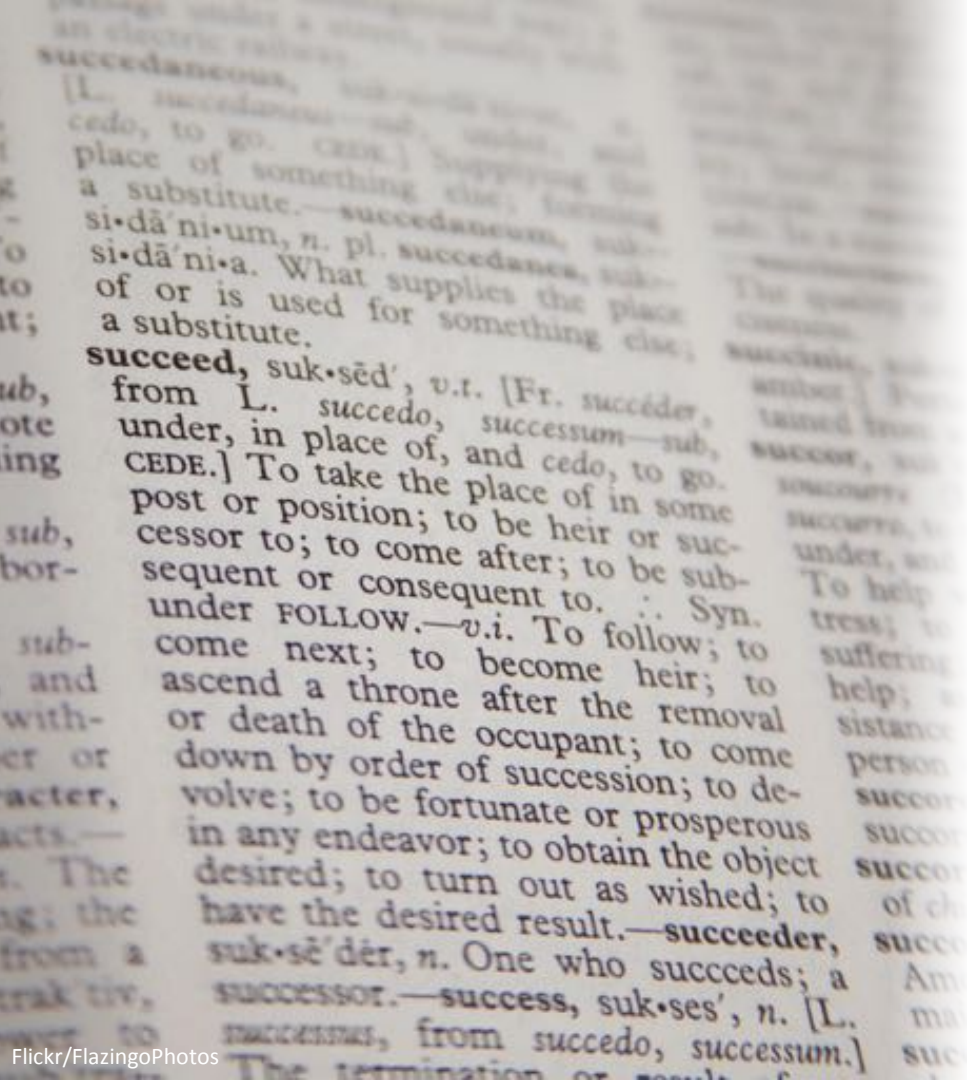
Template Call

Close output file

```
[template public javaMethod(op : Operation)]
        public [op.type/] [op.name/]() {
                // [protected (op.name)]
                // Fill operation implementation

                [returnStatement(op.type)/]
                // [/protected]
        }
[/template]
```

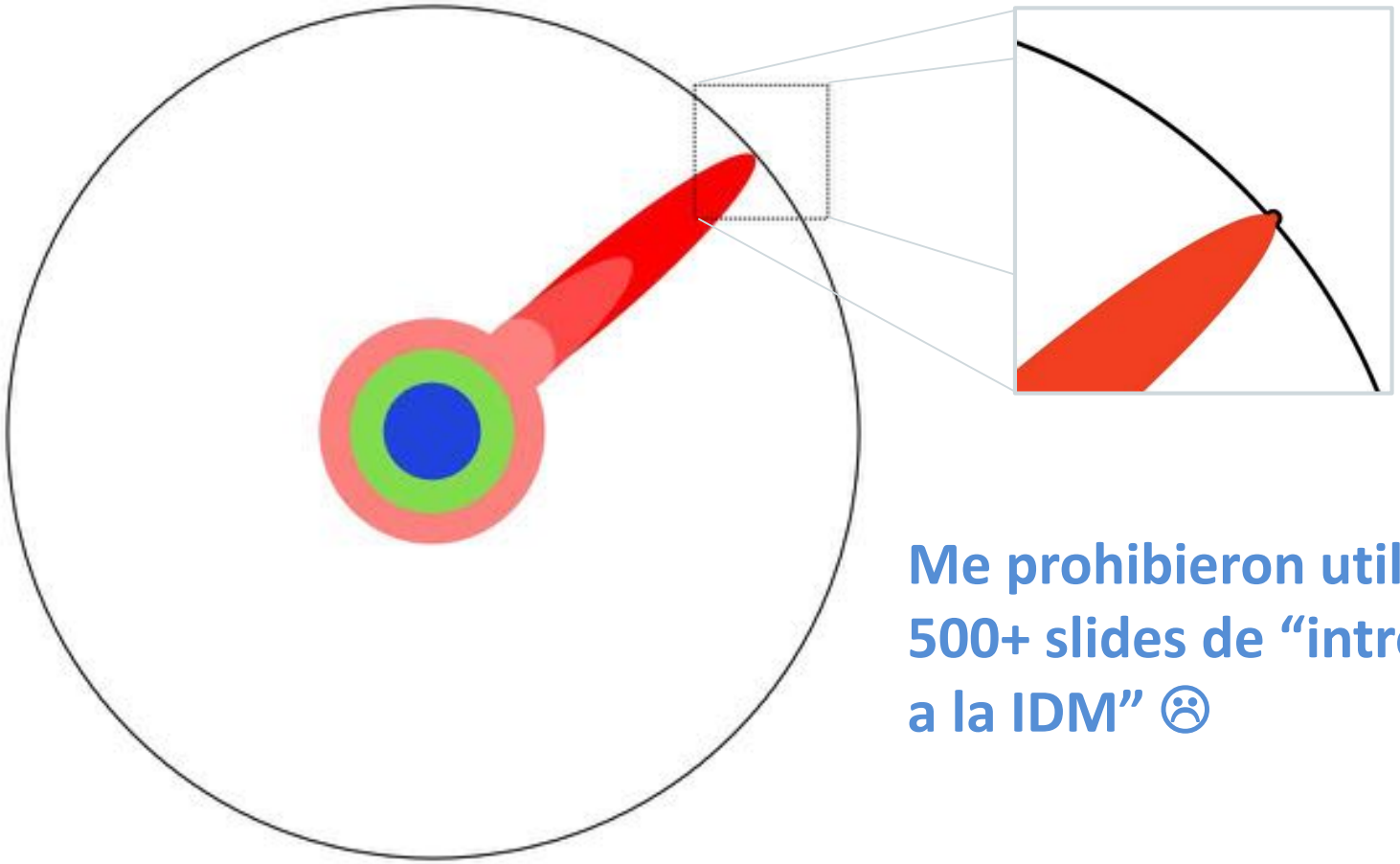
Protected Area



Flickr/FlazingoPhotos

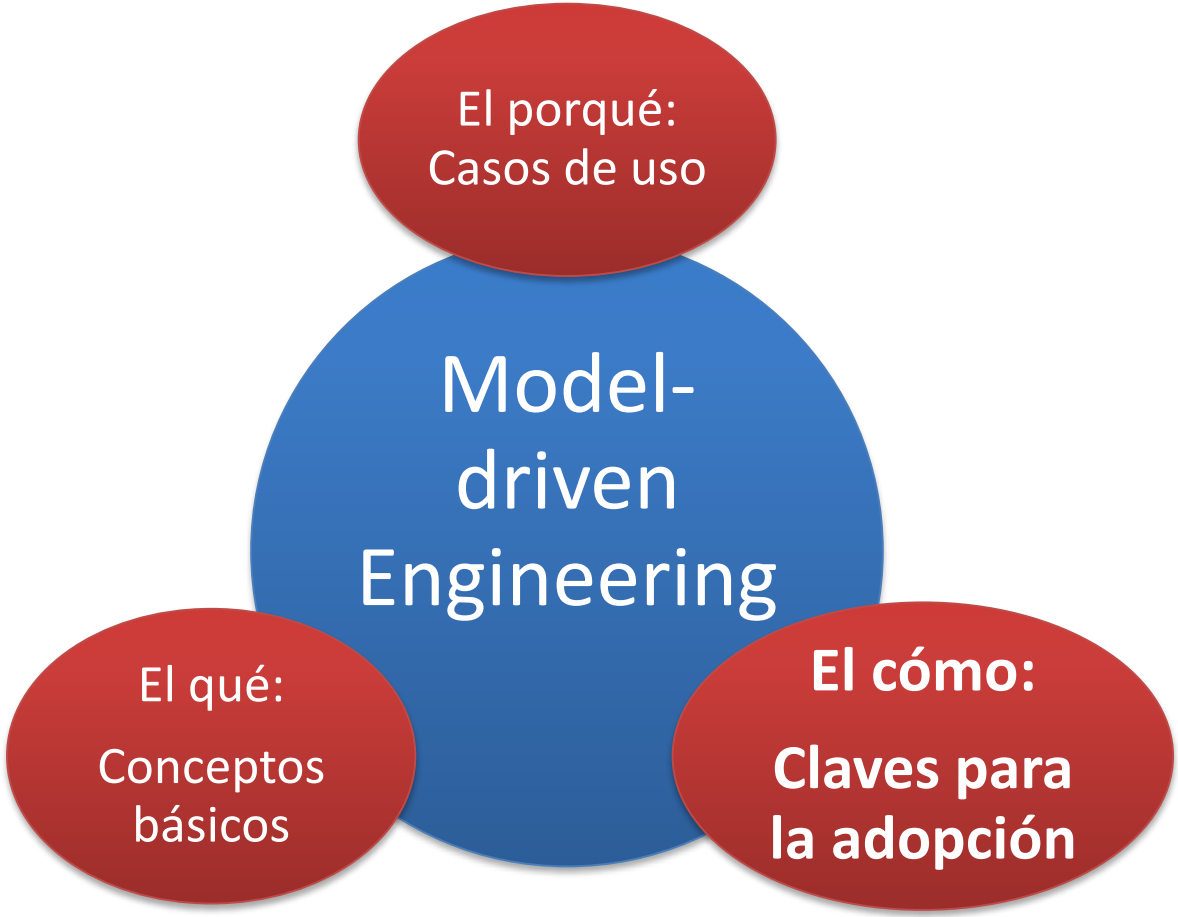
Y aún hay más

- NoSQL
- Rest
- JSON
- Verificación / testing
- Versionado
- Collaboración



Me prohibieron utilizar mis 500+ slides de “introducción a la IDM” ☹

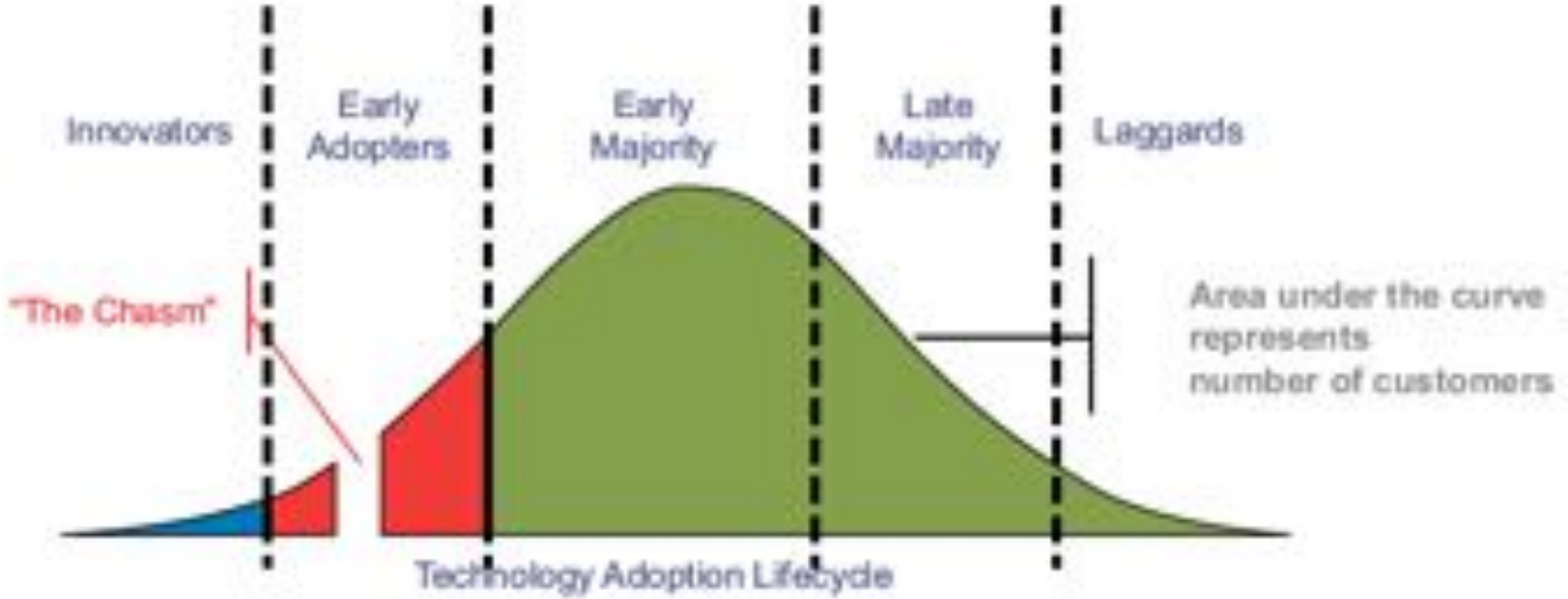
http://matt.might.net/articles/phd-school-in-pictures


El porqué:
Casos de uso
Model-driven Engineering
El qué:
Conceptos básicos
El cómo:
Claves para la adopción

PERO lo lleva diciendo desde 1985

Adopción MDE

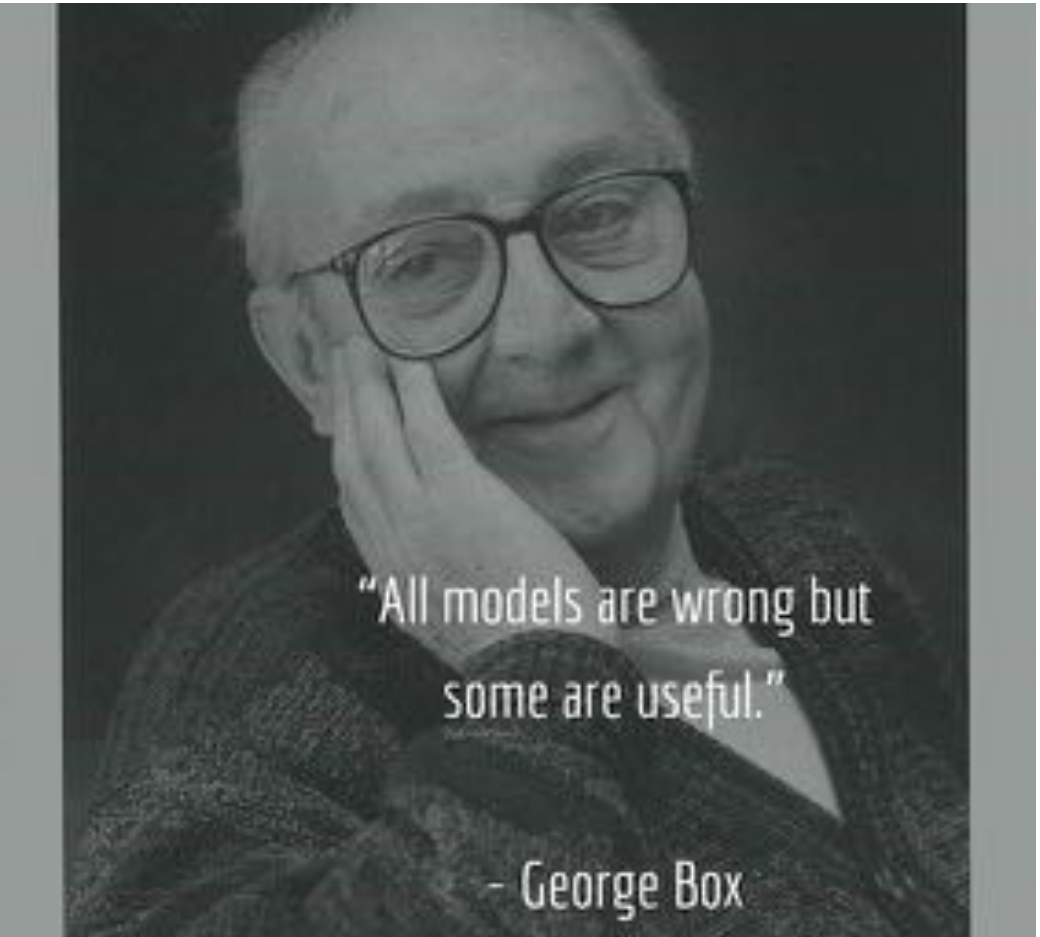
Adoption Lifecycle



Adopción MDE


No existe una
poción mágica

Depende, de qué depende…



Depende del proyecto:

- **Objetivo**
- **Tecnología**
- **Equipo**
- **Tamaño**
- **Dominio**

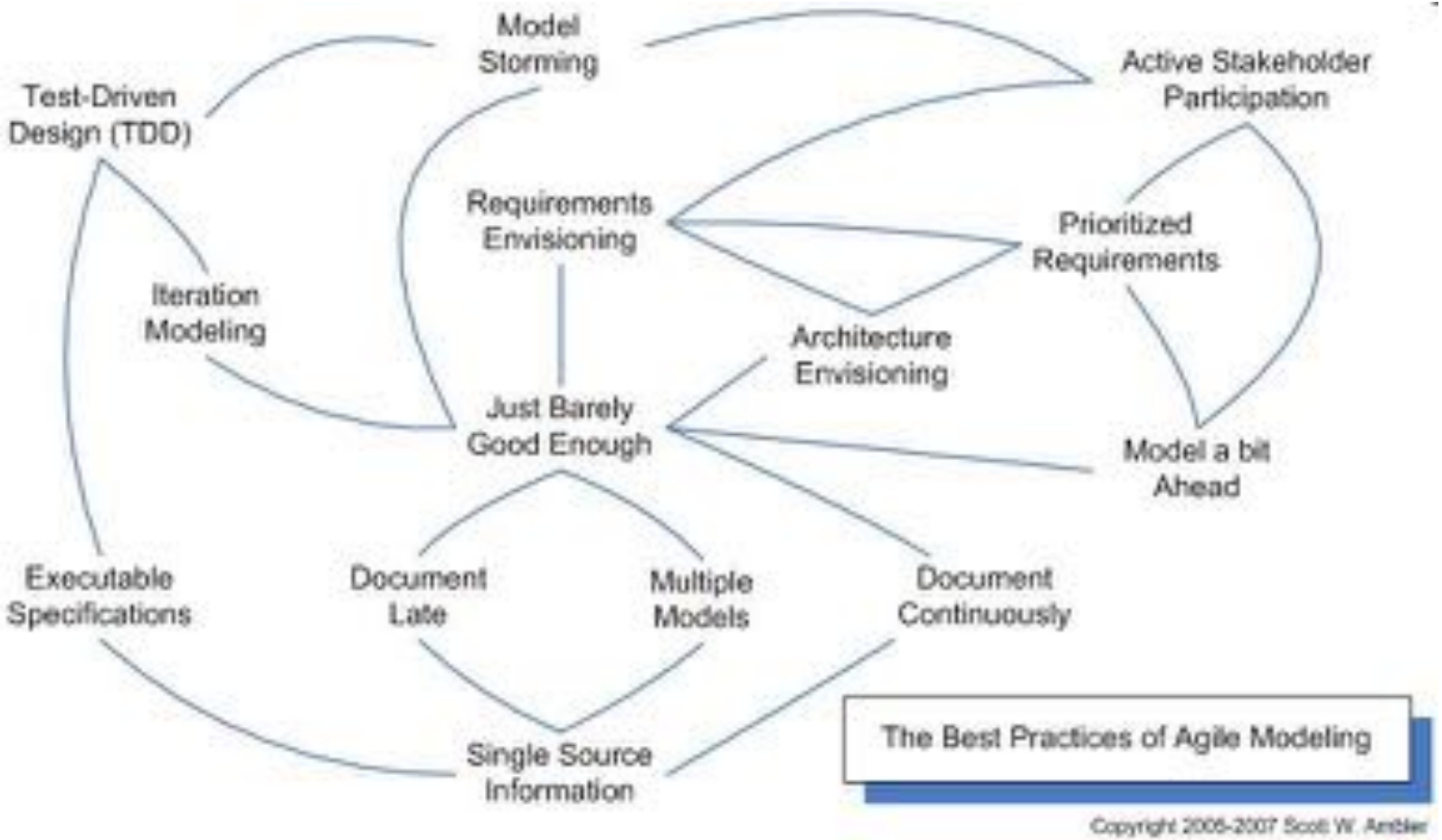
Consejo: Evalúa tu equipo

Socio-technical Congruence: MDE requiere nuevos roles, nuevas tareas...

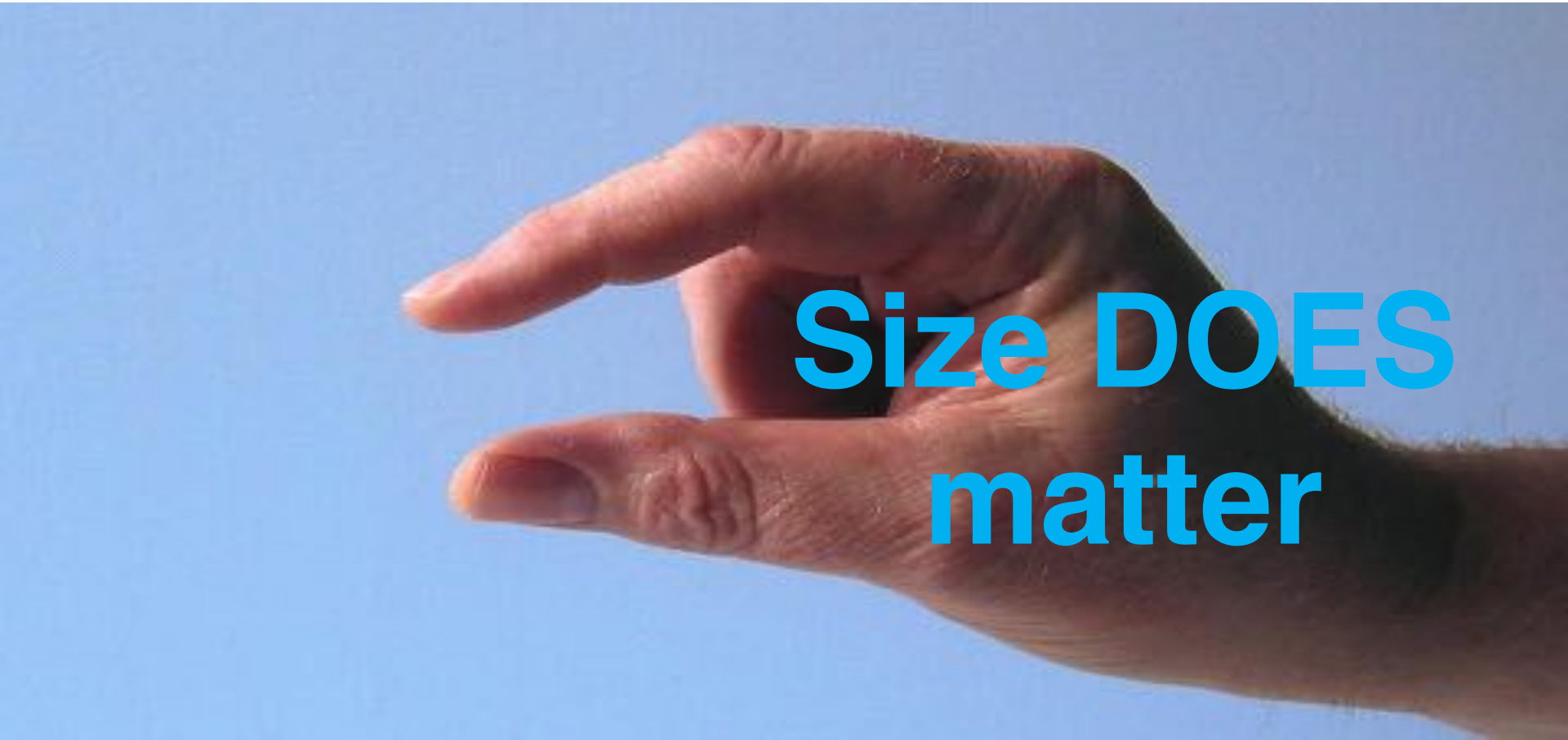
Consejo: Educa a tu equipo

Y incluye personas que lo hayan hecho antes en tu 1er proyecto

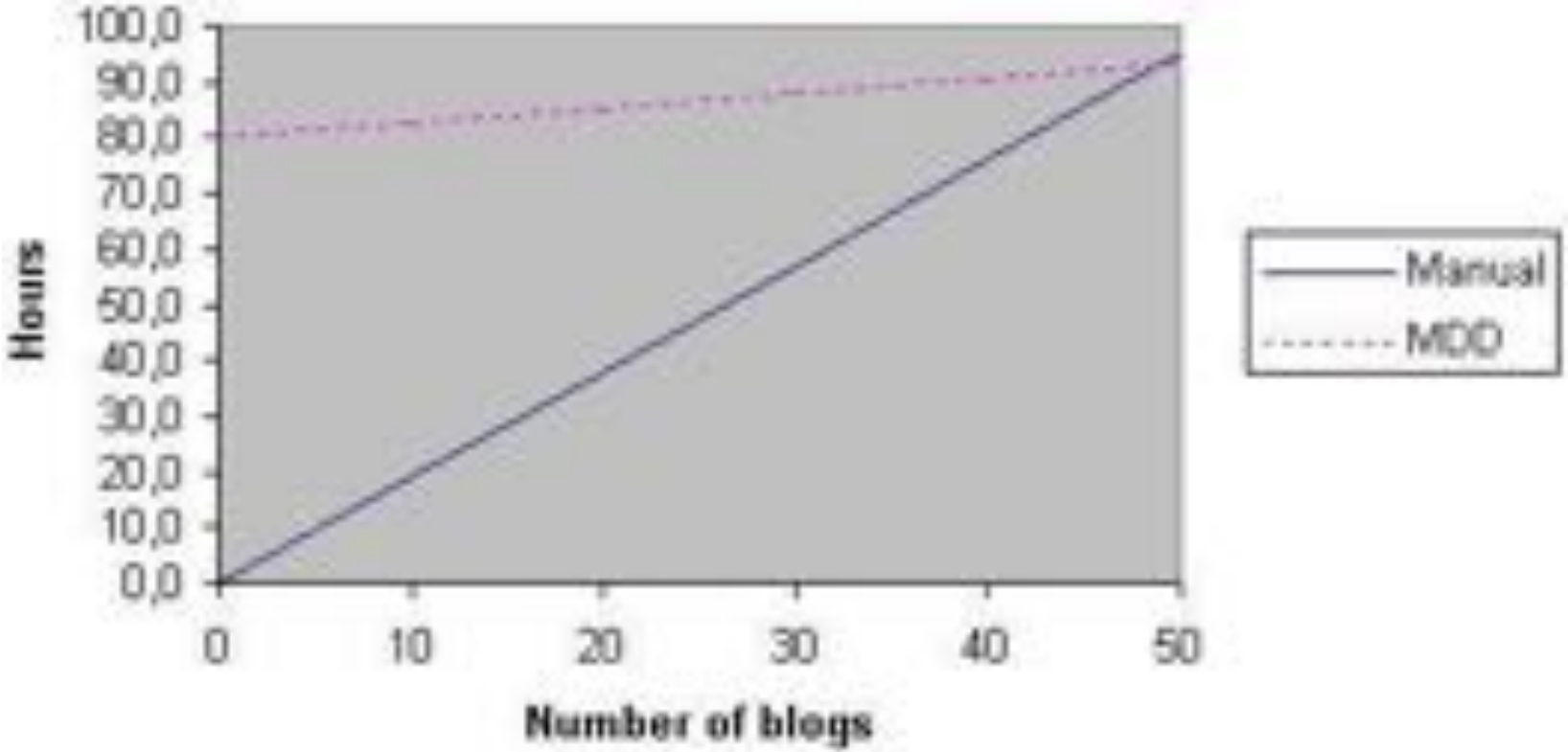
Consejo: Sé ágil



Consejo: “Start small”



Consejo: Ten paciencia



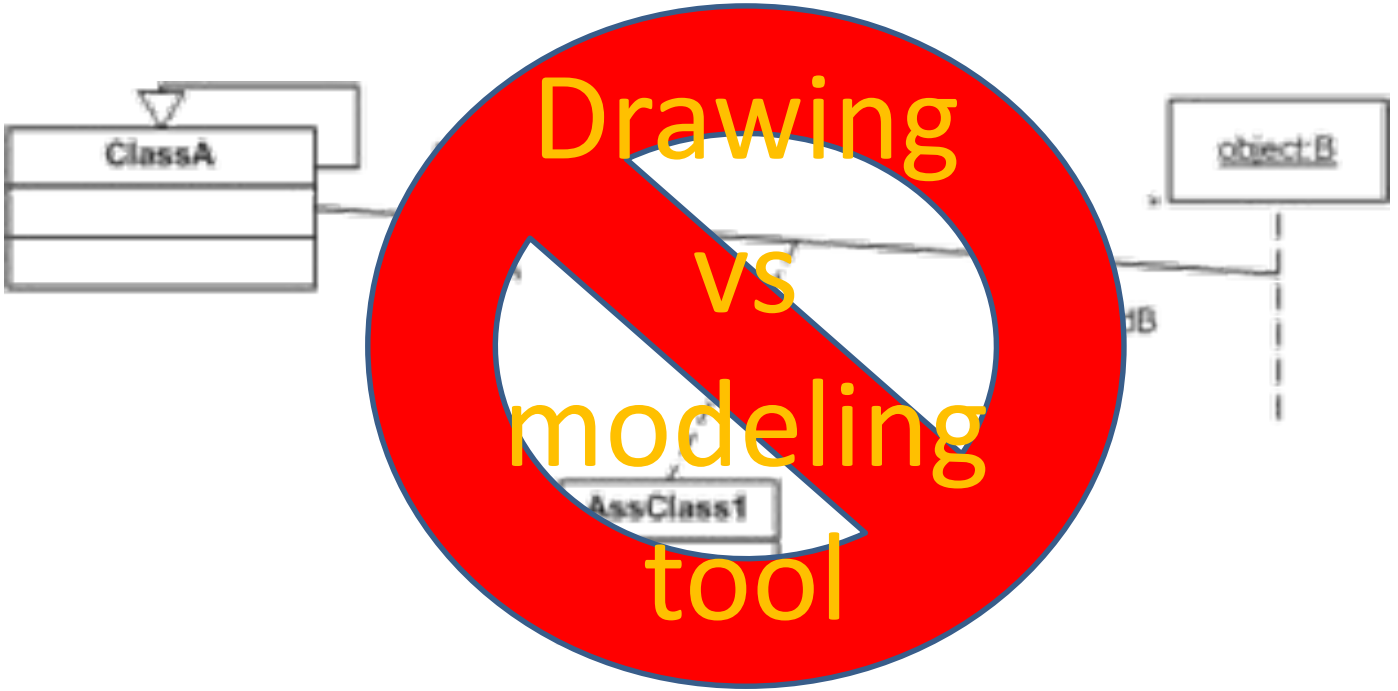
Consejo: Que Management te dé su apoyo

No puede ser sólo un experimento que te “dejen” hacer

Consejo: Los experimentos con gaseosa

Ej: UML es suficiente para la gran mayoría de proyectos

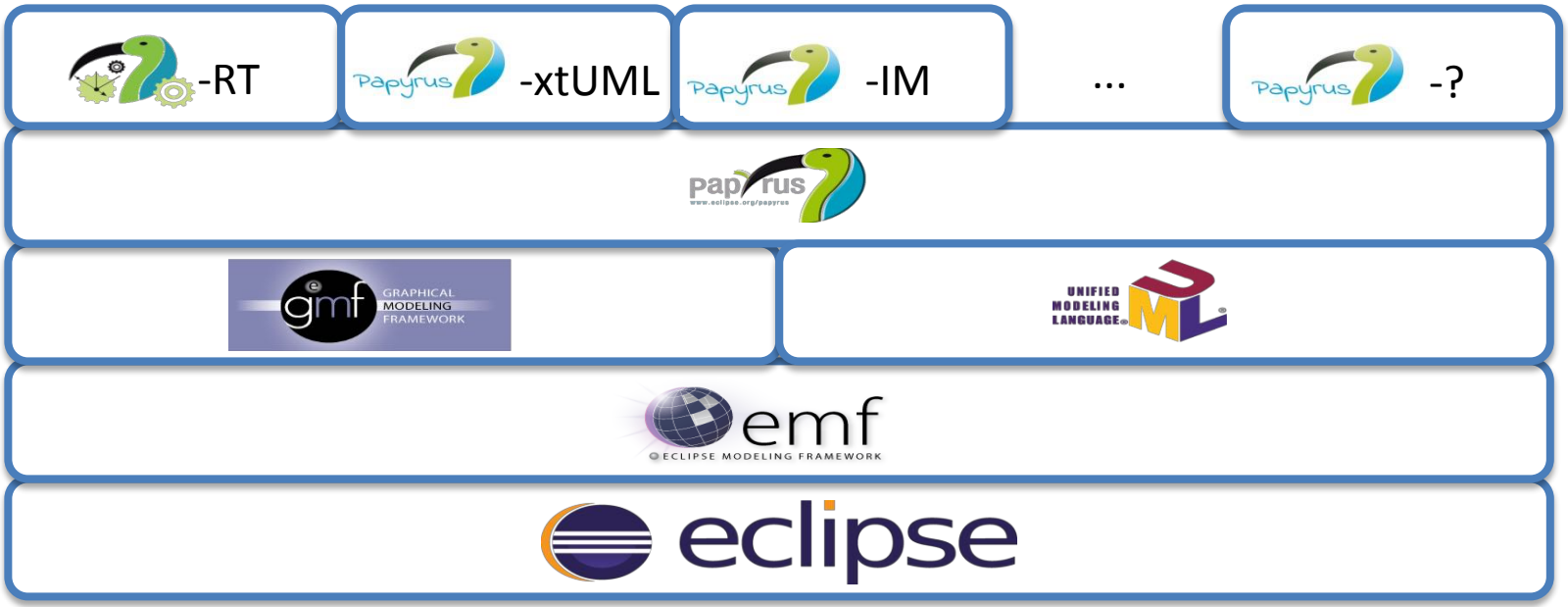
Consejo: Escoge una herramienta de verdad



Papyrus

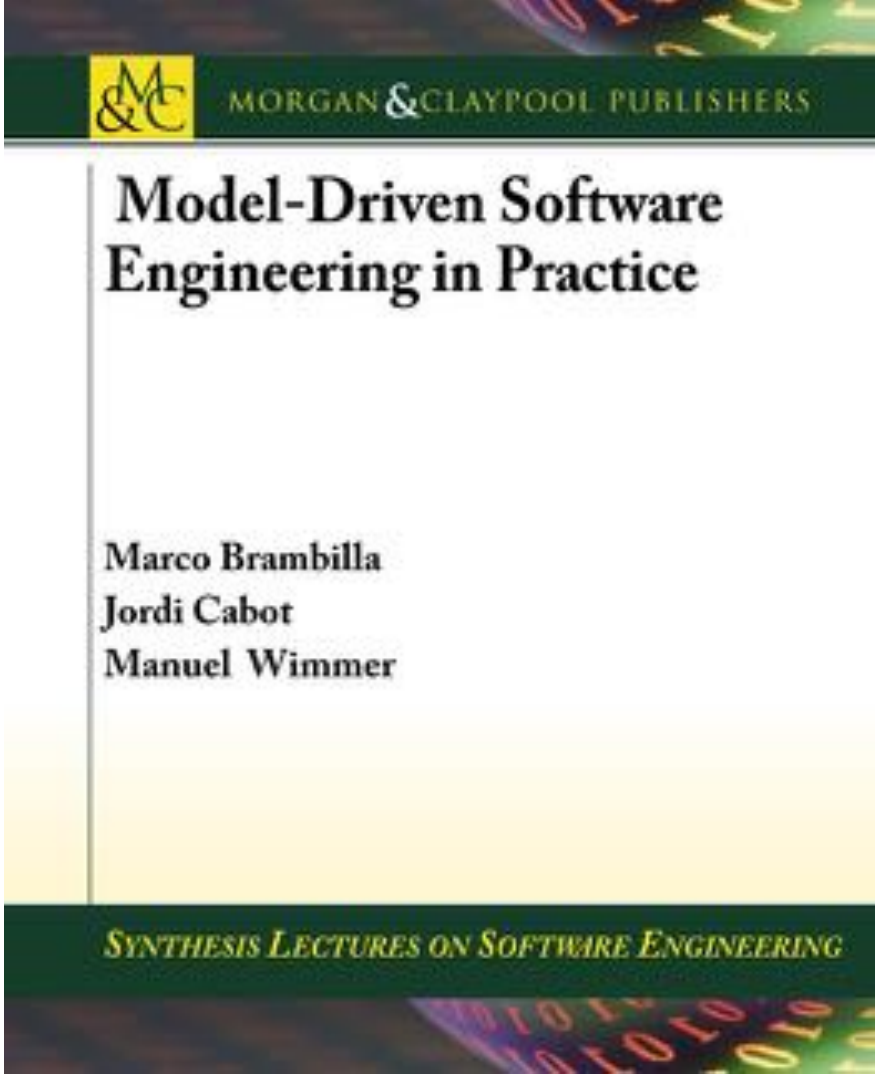
- Una herramienta abierta (open-source) basada en Eclipse para modelaje con UML, SysML y DSLs basados en UML
- Potente consorcio industrial detrás (sostenibilidad)

Papyrus: plataforma




NEVER ATTRIBUTE TO MODELING
WHAT CAN BE ADEQUATELY EXPLAINED BY YOUR INCOMPETENCE


MORE!
MORE!
MORE!


MORGAN & CLAYPOOL PUBLISHERS
Model-Driven Software Engineering in Practice
Marco Brambilla
Jordi Cabot
Manuel Wimmer
SYNTHESIS LECTURES ON SOFTWARE ENGINEERING

http://modeling-languages.com

MOdeling LAnguages

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MDE4EDU – Towards a Corpus of Use-Cases for Model-Driven Engineering Courses

We have embarked on a project to find (and/or define) good use cases for teaching several flavours of model-driven /model-based engineering. Do you want to join us?

Posted by: Jordi Cabot 10/10/2016

NeoEMF: a multi NoSQL Persistence Framework for Very Large Models

In this post we present our latests updates on NeoEMF, our solution to store and access

Posted by: Gwendal Daniel 1/10/2016

Search

SiriusCon 2016

GoJS

Let's work together

(PhDs, Postdocs, consulting, tech transfer...)

jordi.cabot@icrea.cat

@softmodeling