



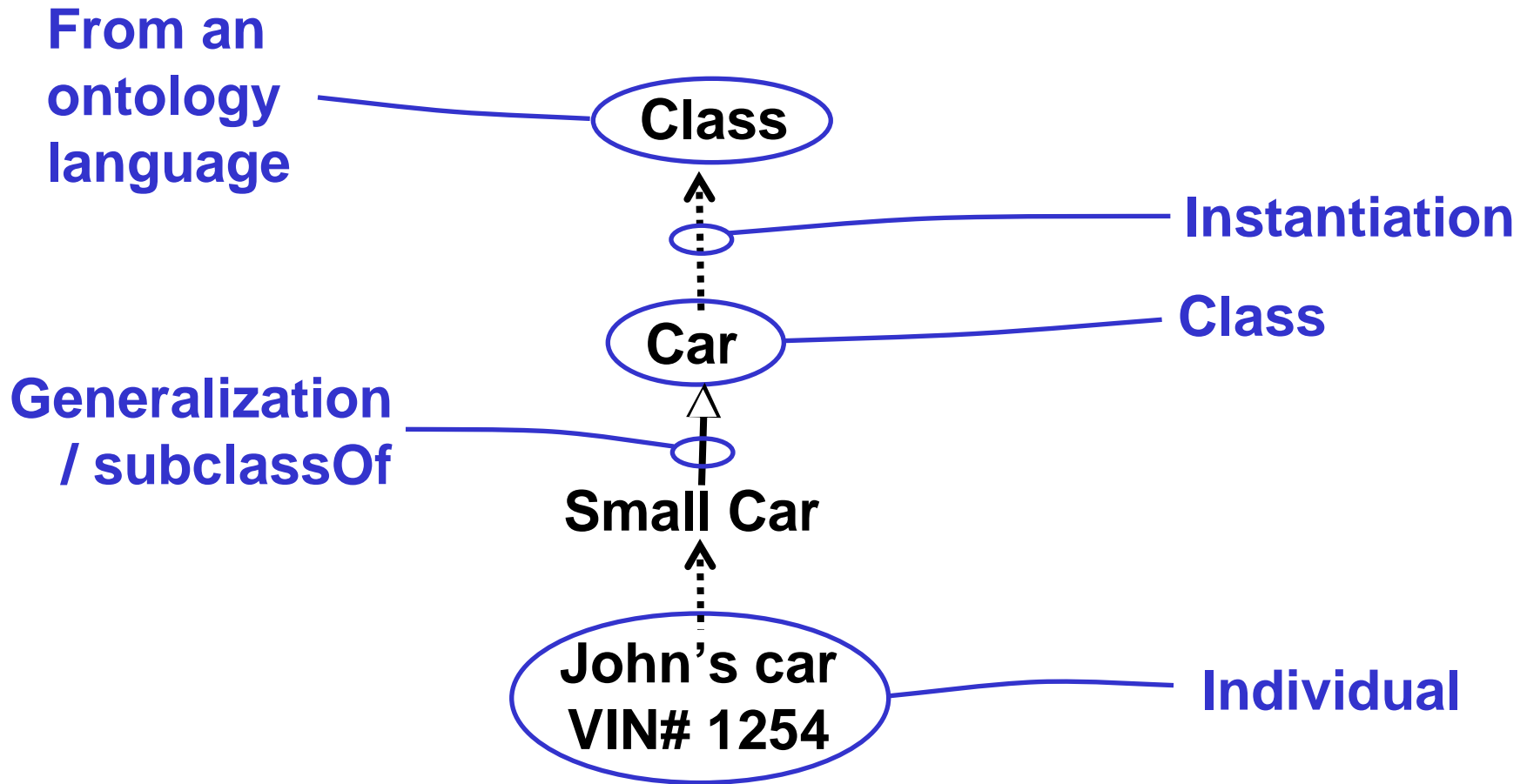
# **Ontologies in Standards: Content and Languages**

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# Ontologies in Standards

- **At least two applications, to define:**
  - **Content (“being”)**
    - **These standards define classes of actual things, such as John’s vehicle with VIN #1254 (a car), or the Queen Elizabeth (a ship).**
  - **Languages**
    - **These standards are languages for defining content, for example a product modeling language could be used to describe cars or ships in general.**

# Ontology for Content



- Product models are classes, can be specialized and instantiated.
- Cannot capture properties of classes (eg, author<sup>3</sup>).

# Ontology for Content

Ontology  
Language  
(M2)

Class



Car



Small Car



Ontology  
(M1)

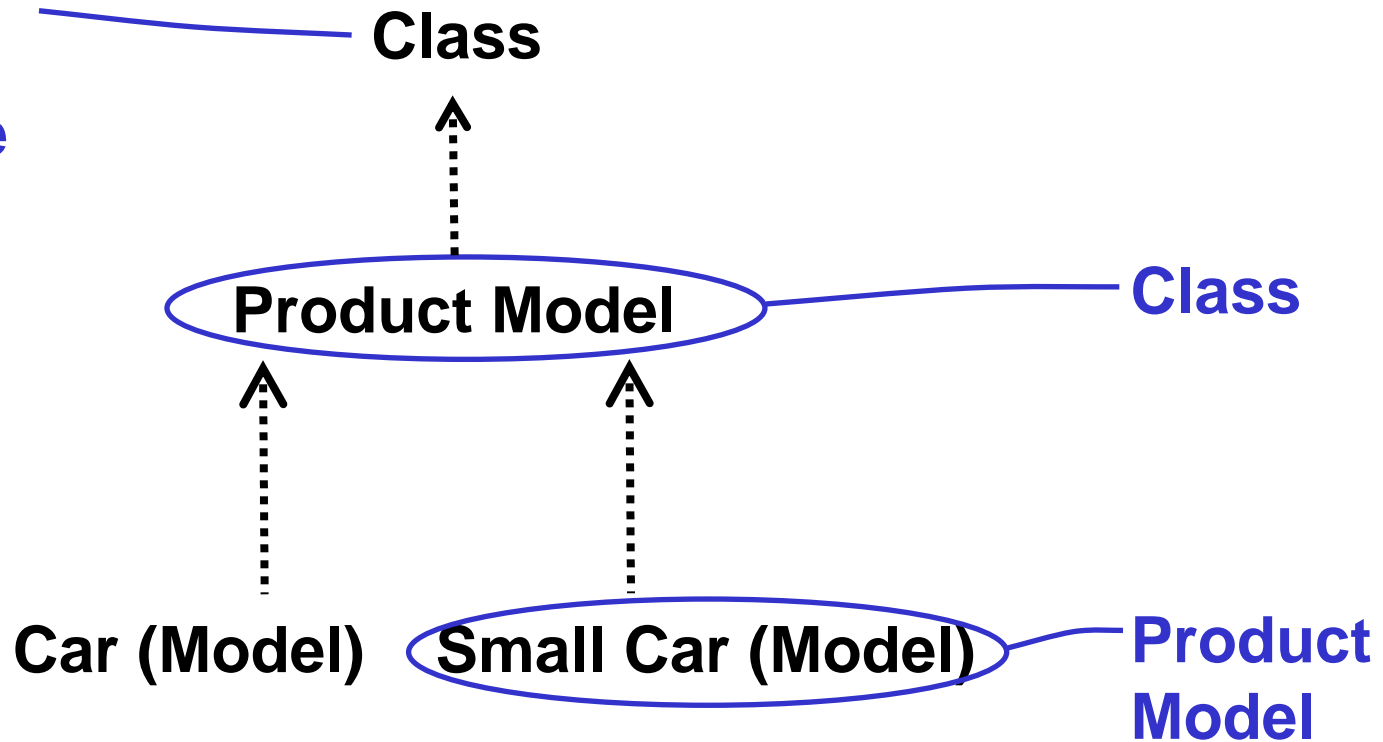
Individuals  
(M0)

John's car  
VIN# 1254

- Levels according to the Model-Driven Architecture from the Object Management Group.

# Ontology for Languages

From an  
ontology  
language



- Cannot instantiate and specialize product models (they are not classes).
- Can capture properties of models (eg, author)<sub>5</sub>

# Ontology for Languages

Meta-  
language  
(M3)

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Class



Modeling  
Language  
(M2)

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Product Model



Model  
(M1)

Car (Model)

Small Car (Model)

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Individuals  
(M0)

- Another level for languages used to define languages (M3).

# Ontology for Languages

- **Languages defined with ontologies (at M3) might not support any of the capabilities typically expected of ontologies.**
  - For example, subclassing at M1 (Small Cars are Cars).
- **Analogy:**
  - A dictionary might define English words using French.
  - Doesn't mean you can say everything in English that you can say in French.

# Ontology for Both

Ontology /  
Modeling  
Language  
(M2)

Class  
↑  
Product Model

Ontology /  
Model  
(M1)

Car (Model)

Class and  
Product Model

Small Car

Individuals  
(M0)

John's car  
VIN# 1254

- Can instantiate and specialize product models (they are classes).
- Can capture properties of models (eg, author).



# Summary

- **Ontologies can be applied in at least two ways in standards, to define**
  - **Classes of “real,” actual things (individuals). This is semantics.**
  - **Languages (used to describe individuals). This is syntax.**
- **Ontology for languages can easily omit the benefits of ontology for the “speakers” of the language.**
- **Define subject matter languages as specializations of ontology languages.**