

SIMF

# Semantic Information Modeling for Federation

*Ontology Summit 2012*

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*Cory Casanave (cory-c at modeldriven dot com)*



OBJECT MANAGEMENT GROUP



Model Driven Solutions

*Where Business Meets Technology*

# Introduction

Cory Casanave

CEO, Model Driven Solutions

Actionable Architectures & Agile Solutions

Information Federation, SOA, EA and MDA Development

Open Source Supporting a Model Driven Approach (ModelDriven.org)

Object Management Group

Board of Directors

Standards work: UML, SoaML, BPMN, EDOC, AESIG, SIMF, Etc.

GovDTF: Chair – Open Government Workgroup

W3C

Government Linked Data (GLD) Workgroup

Government

NIEM: Co-chair NIEM-UML PIM Submission Team

CIO Council/DAS: Open Government Vocabularies Workgroup

# Pivoting through a conceptual model

## The conceptual pivoting approach

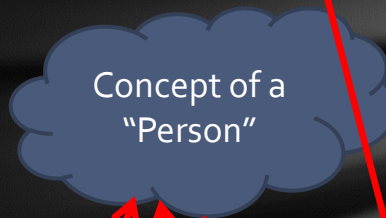
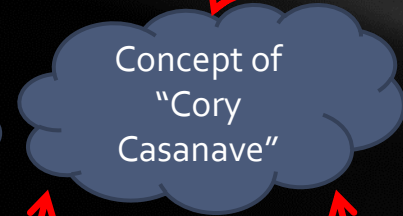
- A common and growing approach to federation and integration leverages abstraction: Defining a domain focused vocabulary with integrity rules and assertions as part of a **conceptual model that captures domain semantics**. Federation and integration is achieved by relating various logical and physical information structures to the conceptual model
- Information federation and integration is achieved via a “**pivot**” through this conceptual semantic layer
- This approach is used, in part, in existing standards such as CCTS (Core Components), ISO 20022 and is currently being utilized in OMG for finance.
- In the majority of cases the “tool” used to represent these common semantics and links is a spreadsheet, but UML and OWL are also used.



# Example of "Pivoting" through a conceptual model

There is an actual "Person", Cory Casanave

- There is a concept of this person shared in this conference, right now
- Here is one representation of him
- "Person" is a shared concept, independent of data structures
- There may also be shared agreement that Cory is a person and some other "facts"
- "Cory Casanave" is a name for this person
- He weighs 240 LBS
- There are multiple data representations about Cory Casanave which may or may not agree
- Those representations can be grounded in concepts (semantics), assisting federation

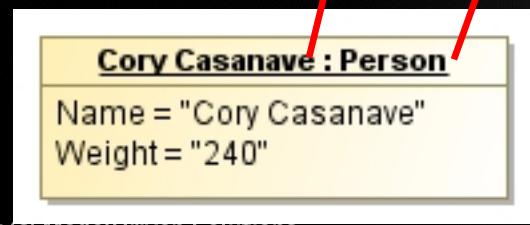


```
<PersonType>  
  <NameText>Cory Casanave</NameText>  
  <Weight-LBS>240</Weight-LBS>  
</PersonType>
```

XML

|   | A             | B   |
|---|---------------|-----|
| 1 | Individuals   |     |
| 2 | Name          | LBS |
| 3 | Cory Casanave | 240 |

Excel



Representations

# More on Pivoting

- It must be easy to use and understand – suited to mainstream adoption!
- Both the conceptual and logical information model can be represented as ontologies
- Does not require “deep” semantics, it does require well defined concepts
- No assumption of the same name or “matching” representations
- There can be any number of shared concept “theories”, no single “ring to bind them all”
- SIMF will be federated with other languages, so existing models in existing languages can also be federated
- How automated can it be?
  - Some pivoting will be manual – but the manually asserted information saved
  - Some will be assisted with “human in the loop”
  - Some will be fully automatic
  - There may be some tool variation in the automation, but not the representation
- Other semantic technologies will be needed to “project” the data based on the models and provide the federated information capability, completing a semantic mediation platform.

There is no 100% solution – and that is not what we need. Even a minor improvement in federation capabilities could make an impact at the level of the *gross national product*\*.

\* Joe Bugajski, Visa International



# Semantic Federation Today

## Conceptual modeling with relations to structural models is not new

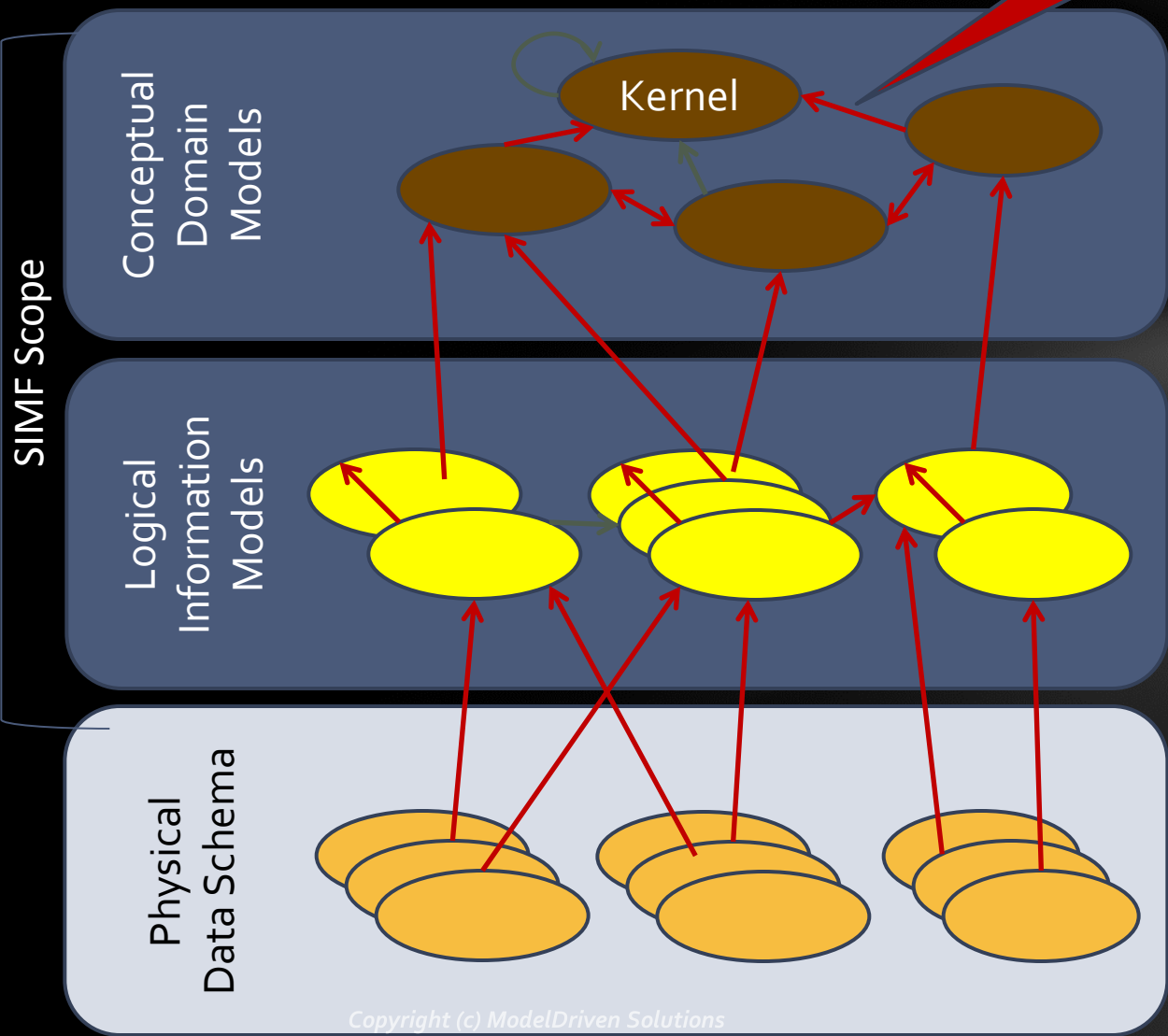
- It is done with a variety of representations
  - UML, OWL, RDFS, E/R, Spreadsheets, FOL Ontologies, SBVR
- With a variety of linking and transformation mechanisms
  - Code, XSLT, FOL, OWL, Rules, QVT, Proprietary
- **What seems to work now – working with what we have**
  - Conceptual UML models with extensions for linking, transformed to RDF-LOD
  - RDFS models with rules and a bit of OWL
  - Structured English (i.e. SBVR) representations of conceptual models
  - A bit of structural mapping, some proprietary solutions
- **None of these approaches seem ideal for the task and all require substantial expertise**, more than is practical for mainstream adoption. But, they can inform SIMF “built for purpose” standards and tools.

# Semantic Information Modeling for Federation

*Current RFP in OMG focused on  
Federation through Conceptual  
Modeling*

# SIMF Architecture

Model Bridging Relations



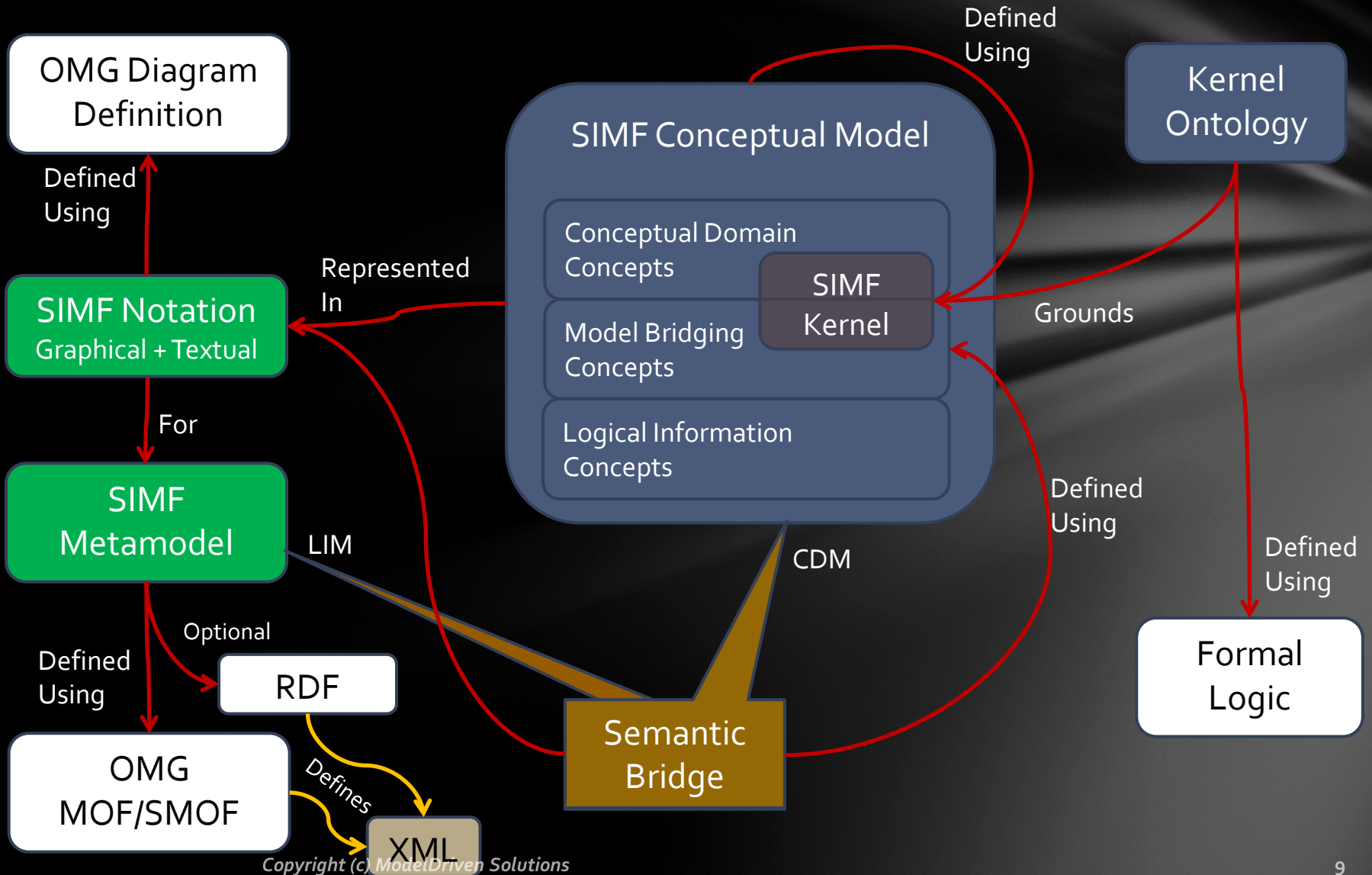
Subject focused conceptual models define the concepts, predicates, integrity rules and terms of a domain that can be related to each other

Solution focused logical information elements represent information structures and integrity rules that can use and extend other information

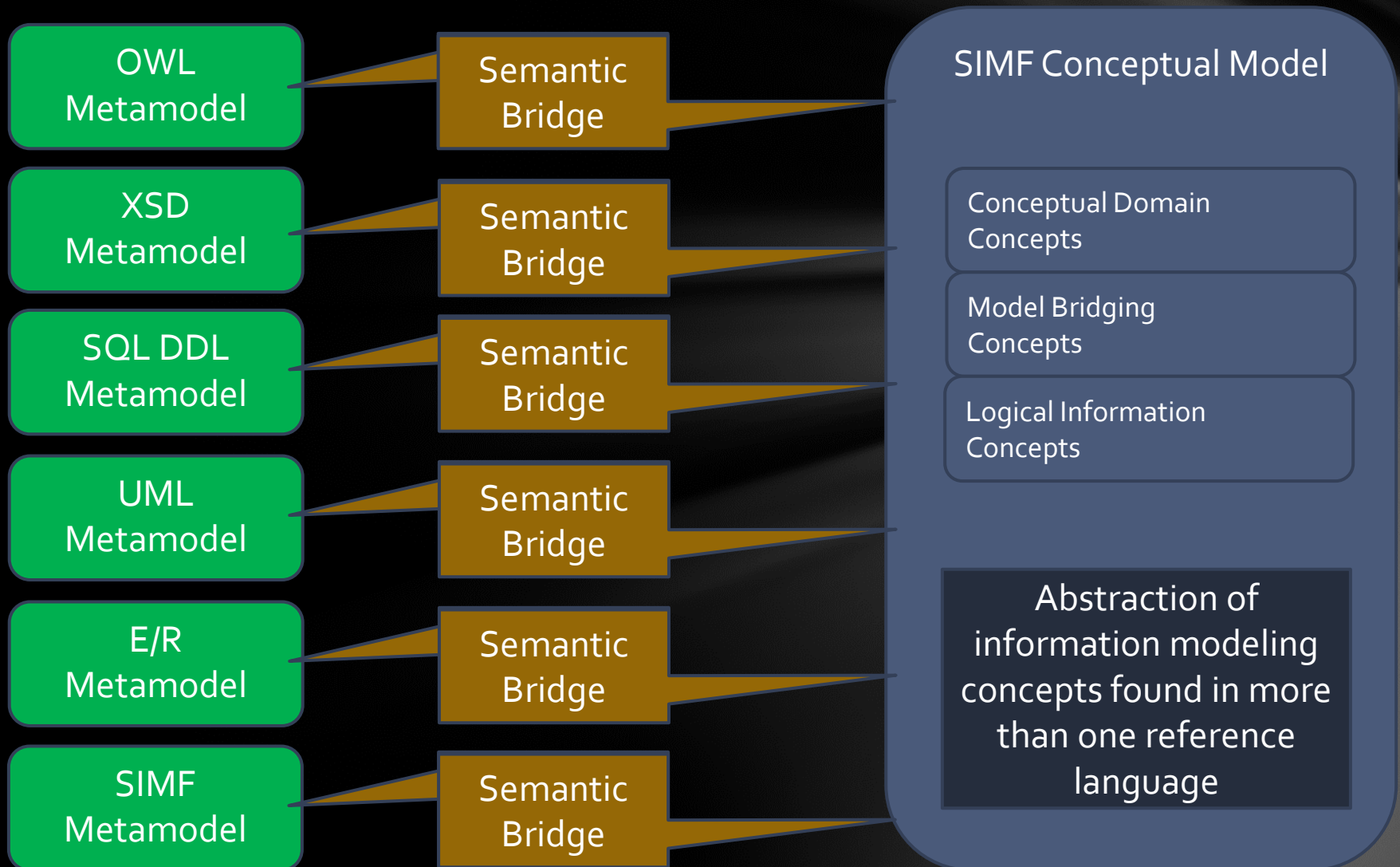
Technology focused physical data schema are grounded in logical data models which define their context and semantics



# SIMF Language Definition



# SIMF Language Federation



# Summary of SIMF Requirements

Conceptual Model of SIMF expressed in SIMF notation

- Conceptual Domain Model

- Logical Information Model

- Model Bridging Relations

Grounding in formal logic (Common Logic Default)

Textual and graphical notations

Bridging to common information modeling languages

- ER, SQL DDL, XSD, UML, SBVR, OWL, RDFS

Metamodel and exchange format for OMG-MOF and (Optionally) RDF



# How does SIMF relate to...

As a federation capability, “overlap” with other views of information, semantics and conceptual models is required and intended.

So if your saying : We can do that with {OWL, Rules, UML, XSLT, CL, My Product...} we want to listen.

It is expected that other standards will be proposed by submitters to fulfill requirements as part of the SIMF specification

Since there are multiple choices for what to reuse and how these existing standards should be integrated into the SIMF solution, the choice of standards to leverage for the SIMF domain specific language is the purview of the submitter and not prescribed by the RFP. It is intended that SIMF build on existing languages!

# SIMF RFP Status

- Issued by the OMG December 2012
- Initial Submissions Due Sept. 2012
- Interested submitters must register by March 15<sup>th</sup>
- Multiple submission groups forming

Find more about SIMF here:

- <http://tinyurl.com/SIMFrfp>

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Contact

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