

Taming Complexity in the Financial Services Industry

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Semantic Arts

- ▶ Small consulting firm, specializing in helping large organizations apply semantic technology to their enterprise architectures

Semantic Arts' Clients



What do you get when you cross the Godfather with a Financial Analyst?



What do you get when you cross the Godfather with a Financial Analyst?



They'll make you an offer you can't understand

Semantics

- ▶ -> greater understanding
 - ▶ -> more agreement
 - ▶ -> opportunity to simplify

Look at Three Examples

- ▶ Sallie Mae
- ▶ A Large Investment Bank
- ▶ Washington Secretary of State

- ▶ Leading provider of student loans
- ▶ We built an Enterprise Ontology for them in early 2009.

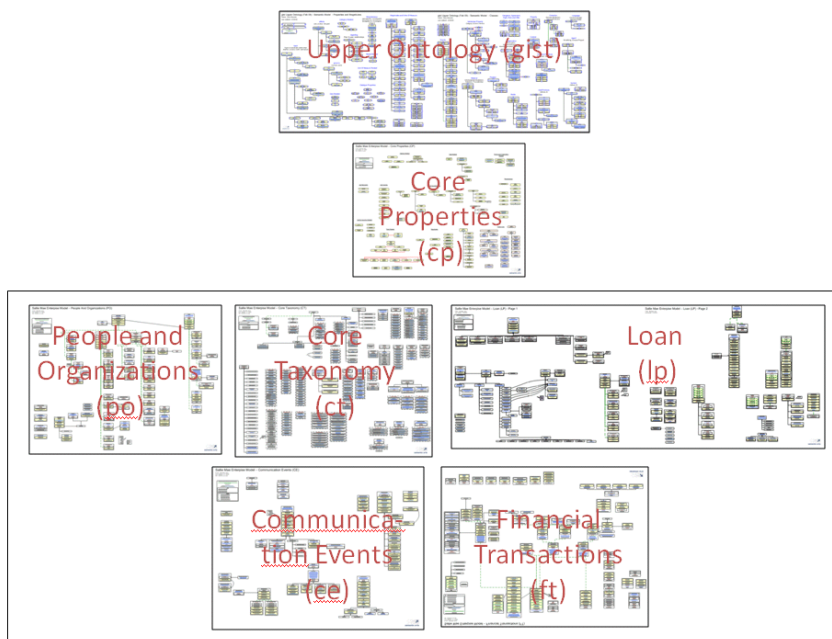
Their existing loan servicing databases

| | tables | attributes |
|-----------------|---------------|-------------------|
| Class | 582 | 10,230 |
| LoanCons | 133 | 15,295 |
| Eagle I | 356 | 13,538 |
| Eagle II | 464 | 12,502 |
| | 1,535 | 51,565 |

These are the number of distinctions being made in the current systems



Sallie Mae Enterprise Ontology

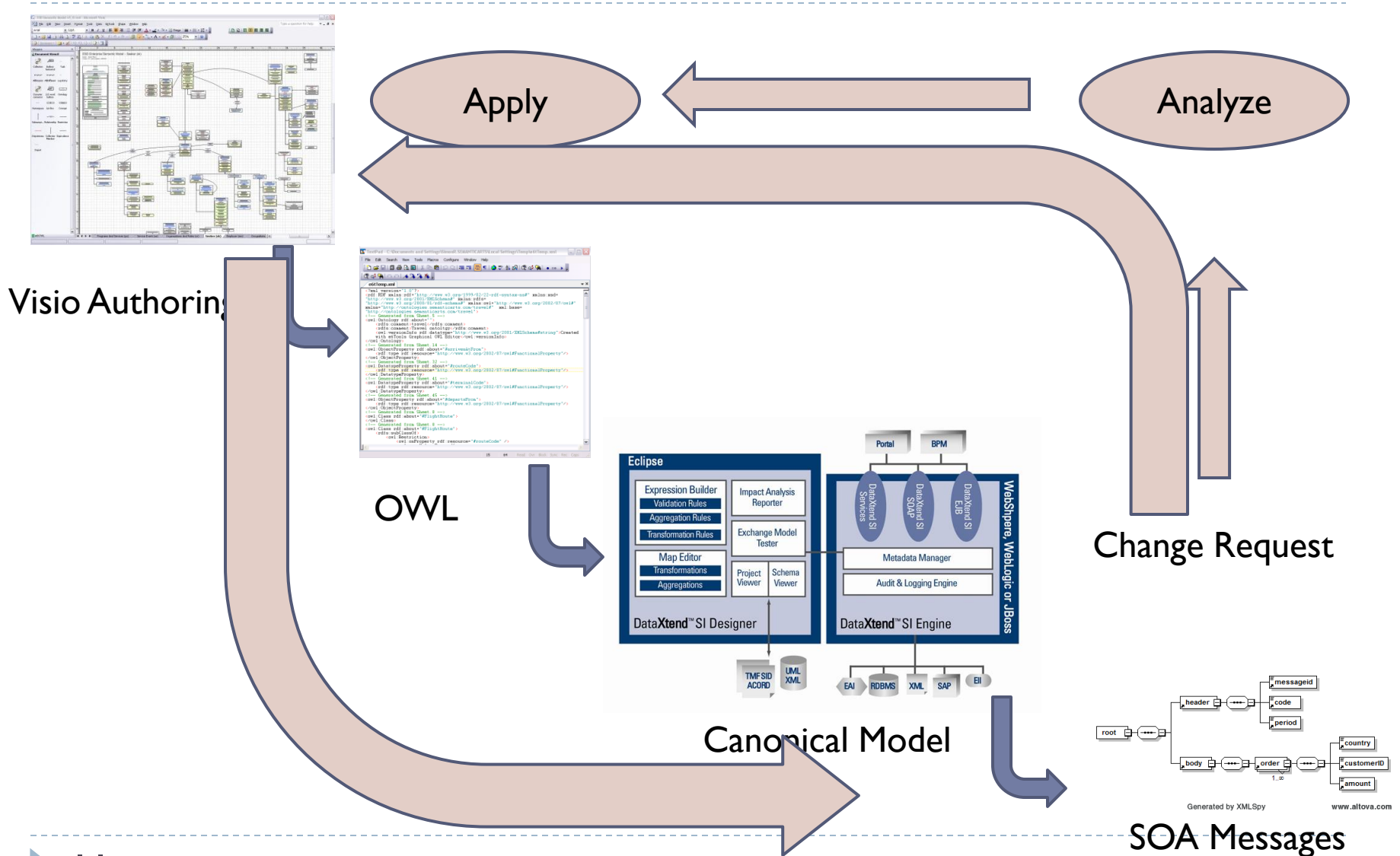


| | |
|---------------------------|-------------|
| Classes | 574 |
| Object Properties | 250 |
| Data Type Properties | 38 |
| Total T-Box Axioms | 1470 |

The original goals of the Sallie Mae Enterprise Semantic Model were to:

- ▶ Create **formal business definitions** of the principal concepts in use across the organization.
- ▶ Validate the model against existing data bases and interfaces, and start the process of **formally describing the existing data** using those enterprise definitions.
- ▶ Provide a basis for integrating structured and **unstructured data**.

Pivot – used to harmonize new service / SOA



Original Ontology

- ▶ Grew
- ▶ But not by much
- ▶ Surprising that you can take 90% of the complexity out and still have most of what you need

Investment Bank

- ▶ Activity Based Costing for Operational Expenses (700 activities)
- ▶ 5000 Risk Assessments reviewed per quarter
- ▶ An almost infinite number of possible paths through the back office to clear a trade
- ▶ An ontology + small faceted taxonomies leveraged off the ontology lead to a 10 X reduction in complexity in each of the areas examined

WA Secretary of State

- ▶ Existing system consists of 250 tables and 3000 attributes
- ▶ This is primarily dealing with Legal Entities and their registration
- ▶ New design, more powerful has 109 classes and 99 properties
- ▶ Again a 10 fold reduction in complexity

Complexity reduction

- ▶ In each of these cases we've reduced ontological complexity by at least 90% without significant loss of fidelity
- ▶ How is this possible?
- ▶ How is this necessary?

How is this necessary?

- ▶ In traditional design we have collectively developed some very dysfunctional ways of dealing with complexity
- ▶ The first thing we do, is anytime we come across something slightly different, we create either a new attribute or a new table
- ▶ We keep doing this until the complexity of the design we have exceeds our ability to understand it and/or implement it (which are generally the same thing)

How is this necessary?

- ▶ The larger the organization, the smaller the scope of an application that rises to that level of complexity
- ▶ The prevailing approach has been to keep adding applications (purchased or built) with un-coordinated schemas
- ▶ And then attempting to integrate them later
- ▶ This is what gives rise to hundreds of thousands of attributes
- ▶ And excessive integration budgets

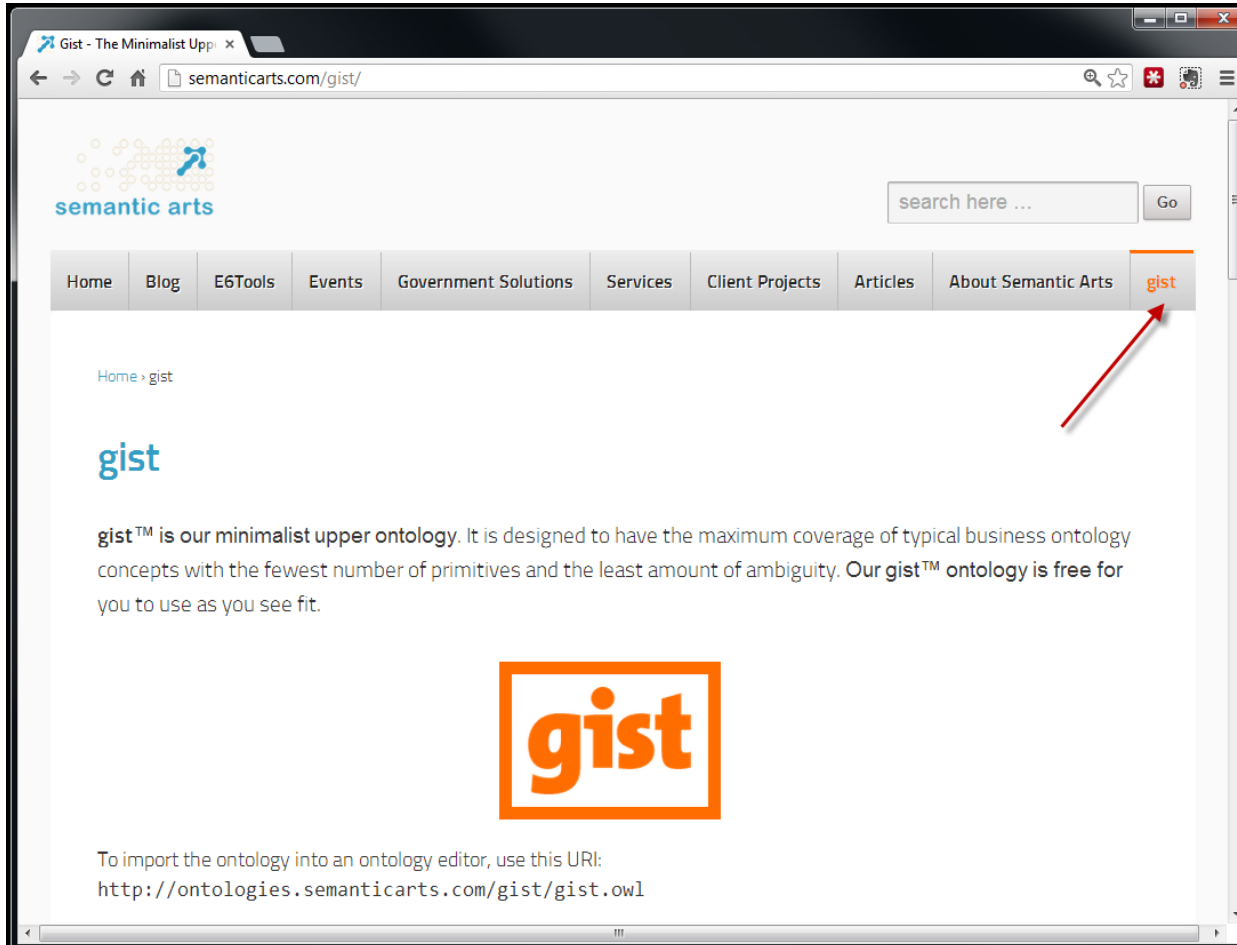
How is this possible? (how do we reduce the complexity)

- ▶ There is a temptation to try to semantically describe all the complexity you encounter
- ▶ This is a lot of work
- ▶ And worse, it tends to cause you to go into agreement with the existing schema
- ▶ That is, the existing schema sounds reasonable

How is this possible? (how do we reduce the complexity)

- ▶ We start with people.
- ▶ SMEs and analysts who understand the data (not just the data bases)
- ▶ And we use “gist” to force us to be much more economical in creation of new concepts

Get gist from our web site



(www.semanticarts.com/gist)

gist – Major Families of Classes

UnitOfMeasure

Magnitude

Other (Collections, Concept, Language)

Time

Place

Landmark

Person

Organization

Stuff

Documents

Agreements

Events

Intention



Gist 8.0 (coming soon)

- ▶ 113 classes
- ▶ 80 Object Properties
- ▶ 20 Datatype Properties

- ▶ Much more modular 15 very small modules, each easy to understand
- ▶ Use which portions you need
- ▶ Easier to integrate with other ontologies

How this helps

- ▶ After about a dozen projects we've become confident that most of the concepts we come across are covered
- ▶ Forcing us to think deeply about what the concepts we uncover really are helps reduce ambiguity
- ▶ But forcing us to define them in this small subset forces us to bring together the similar to where we are forced to confront them.

Summary

- ▶ We now know that the complexity in the financial services industry is no different from that in every other industry
- ▶ The economic value of these three is very significant
 - ▶ -> greater understanding
 - ▶ -> more agreement
 - ▶ -> opportunity to simplify