Integrating Information on the Semantic Web Using Partially Ordered Multi Hypersets

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This is not an Outline

1. Motivation
2. Approach
3. Solution
4. Evaluation and Contributions
5. Future work

L'çi n'est pas une pipe.
Gettng machines to *understand* the contents of the web

- I'd better talk to the bank before I spend it, because of what has happened to other people.
- Your bank balance has jumped 8087% to $1234567.89.
- Semantic Web
- 1234567.89
- World Wide Web
Existing Solutions

- Document analysis
  - Yahoo!
  - Google

- Data models
  - Relational Databases
  - Extensible Markup Language (XML)

- Information models
  - Resource Description Framework (RDF)
  - Topic Maps
My Approach

- Integrate other metamodels
  - object-level mappings
  - no changes to source metamodels
  - no loss of information
  - identify provenance

- Flexible and elegant
  - simple
  - closed (self-describing)
  - practical

- Not goals: serialization, code efficiency & complexity
The Braque Metamodel

- Primitives:
  - things
  - relationships
  - order

Partially Ordered Multi Hypersets
Braque in Action

- Naïve Upper Ontology
  - type hierarchies, relations
  - membership reification, roles
  - names, identifiers
  - metatype constraint

- Integration mappings
  - XML: ordered elements, qualified names
  - RDF: types, properties, containers, reification
  - Topic Maps: identification, classes, scopes, names
Evaluation and Contributions

● Braque metamodel
  - collections
  - explicit identification
  - infinite reflection depth
  - ❌ no formal interpretation, open vs. closed worlds

● Integration
  - XML, RDF and Topic Maps
  - complete, automatic, semantically aligned
  - ❌ no schemas, ugly class punning workaround

● Proof of concept implementation
Future Work

- **Theory**
  - mereology, mereotopology, partial sets
  - formal theory, algebra, and interpretation
  - query & inference language, schema ontology

- **Implementation**
  - developer evaluation studies
  - semantic integration with host language
  - visualization, distributed computing

- **Applications**
  - integration: maintain current maps; UML, UDDI
  - modelling multi-dimensional software
  - adoption-centric information management
Thank You