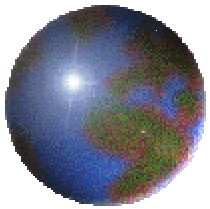
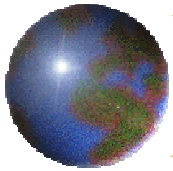


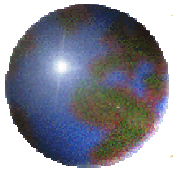
Integrating Information on the Semantic Web Using Partially Ordered Multi Hypersets

Piotr Kaminski
University of Victoria
September 24th, 2002



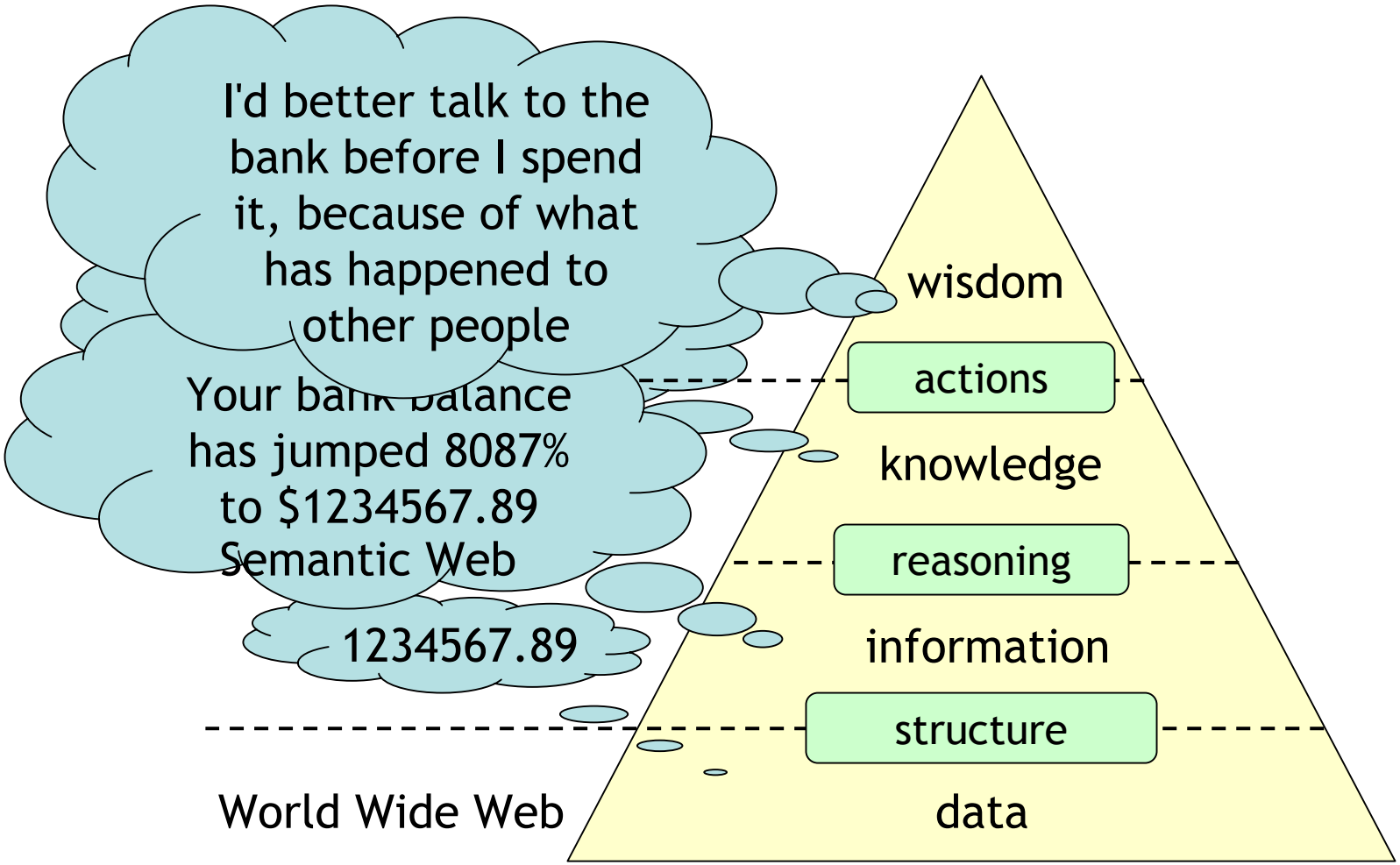
This is not an Outline

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



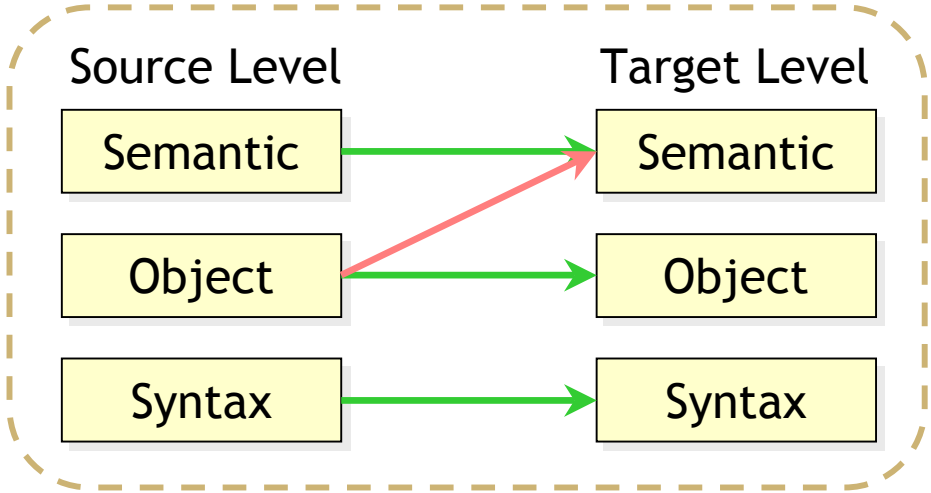
The Semantic Web

- Getting machines to *understand* the contents of the web

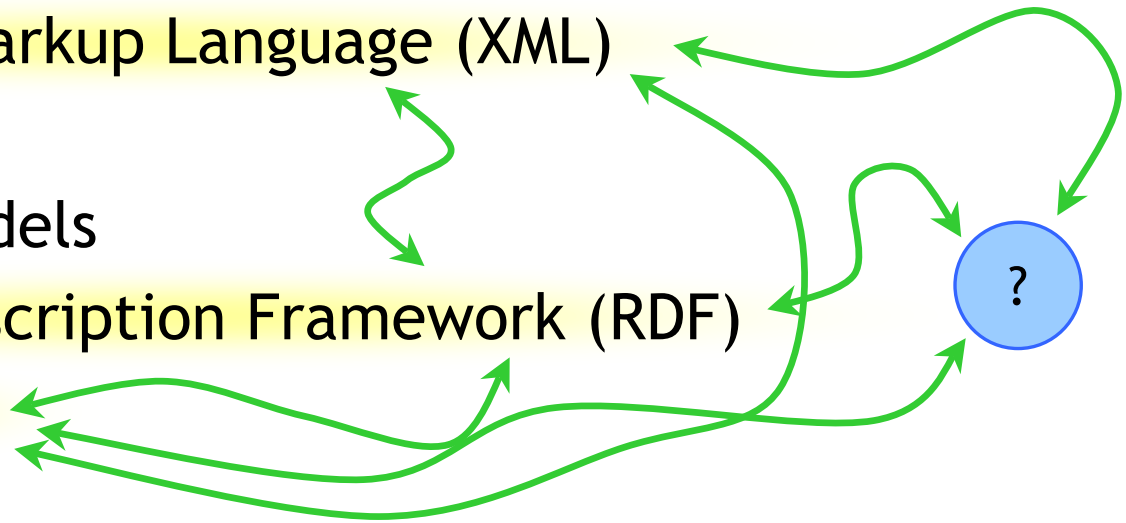


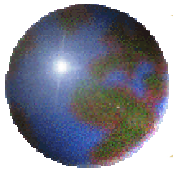
Existing Solutions

- Document analysis
  - Yahoo!
  - Google



- Data models
  - Relational Databases
  - Extensible Markup Language (XML)
- Information models
  - Resource Description Framework (RDF)
  - Topic Maps





My Approach

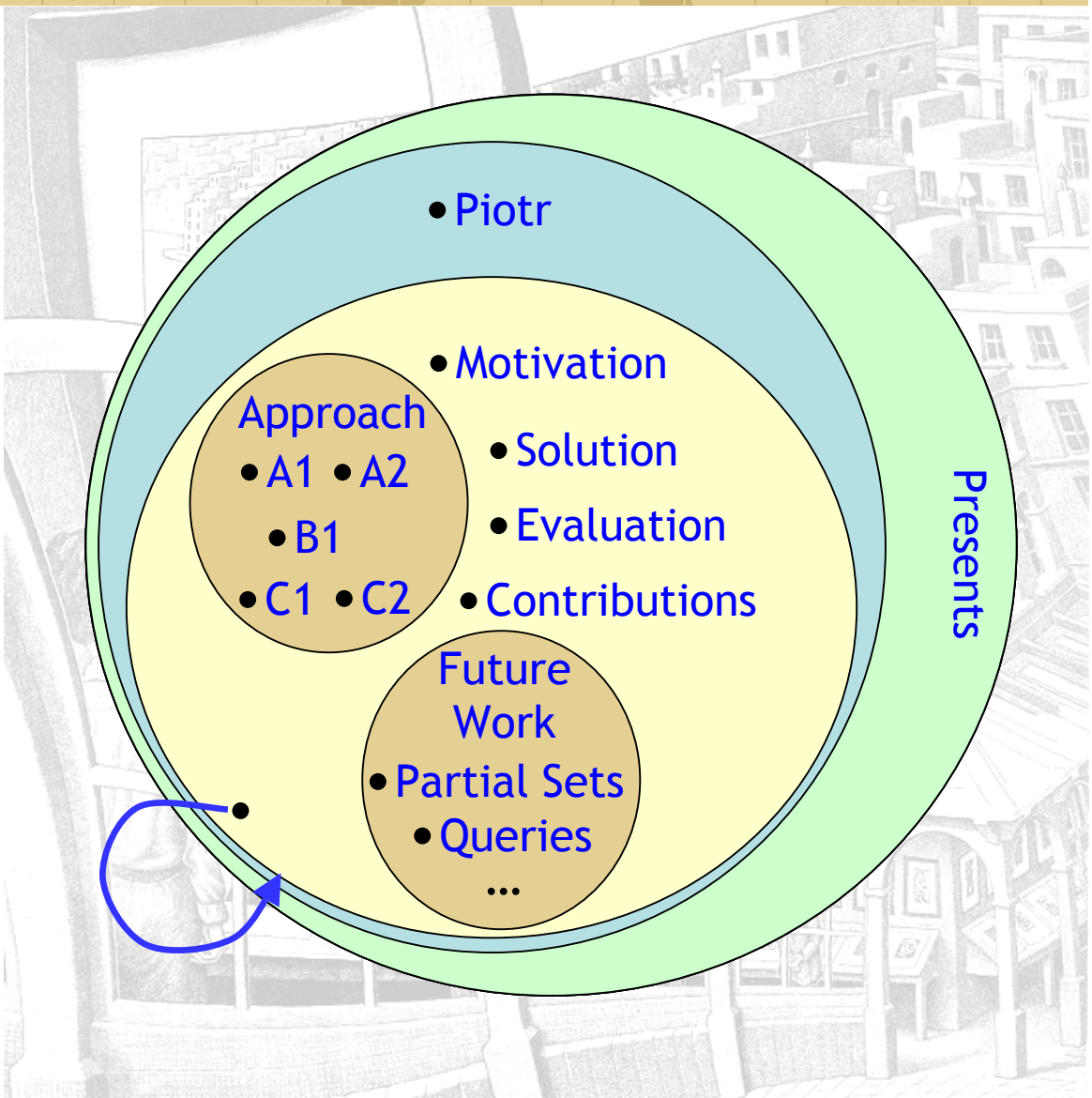
- Integrate other metamodels
  - object-level mappings
  - no changes to source metamodels
  - no loss of information
  - identify provenance
- Flexible and elegant
  - simple
  - closed (self-describing)
  - practical

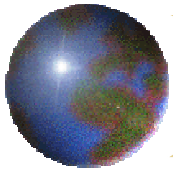
- Not goals: serialization, code efficiency & complexity

The Braque Metamodel

- Primitives:
  - things
  - relationships
  - order

Partially Ordered Multi Hypersets

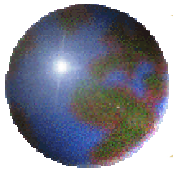




Braque in Action

- 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

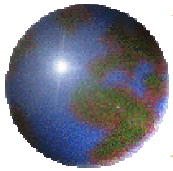


Evaluation and Contributions

- 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

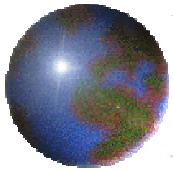
- Proof of concept implementation



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