A Semantic Technologies Roadmap for Earth Science

ESIP GeoSemantics Symposium

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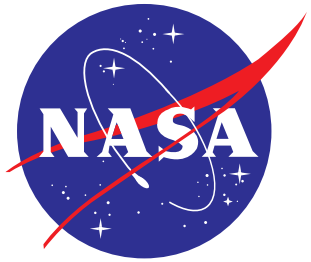


Why do we need a semantic technologies (ST) roadmap for Earth science?

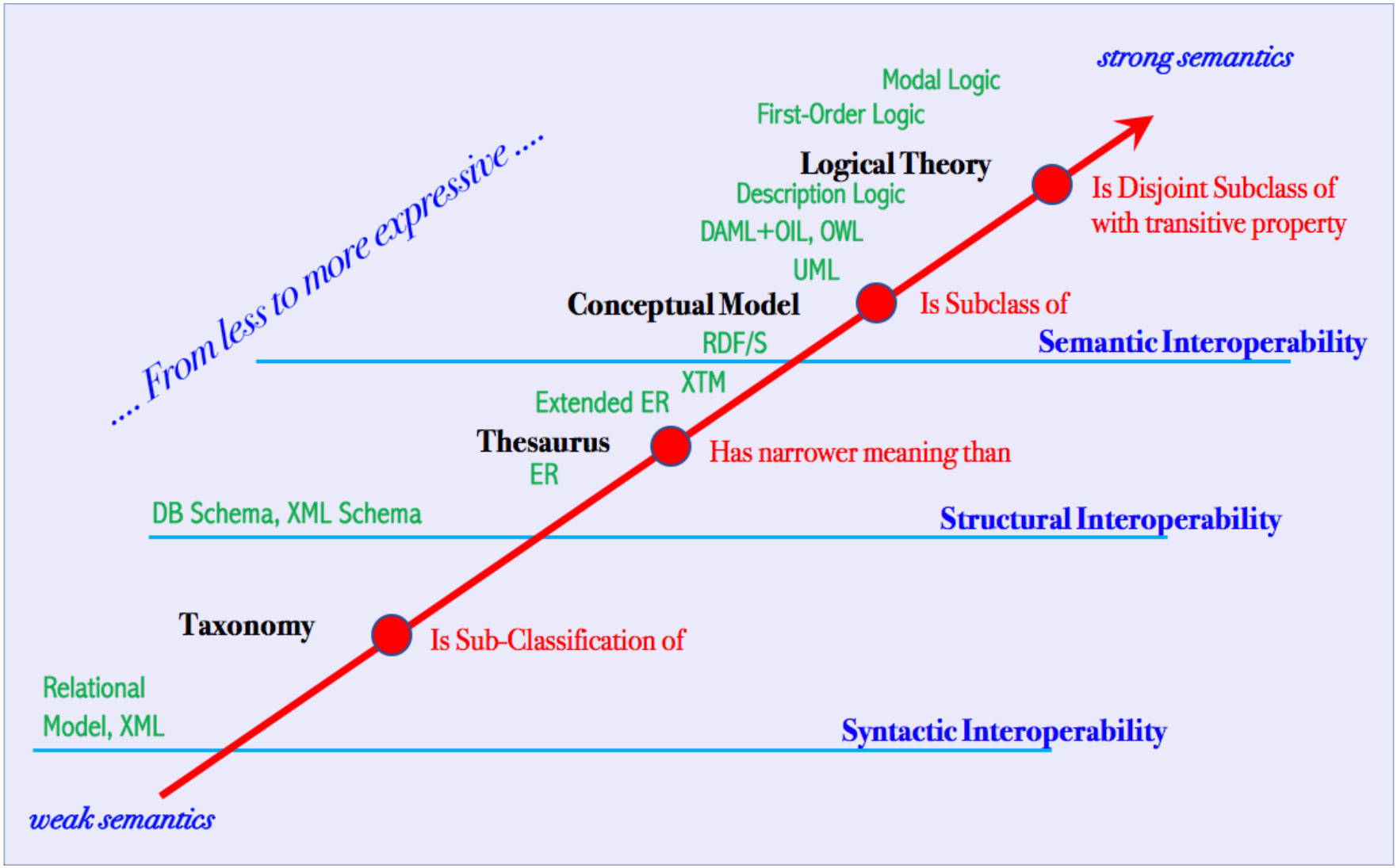
- ST address the still-evolving methodological transformation regarding how meaning is addressed and handled in the digital era
- Yet, consensus varies on what comprises/constitutes semantic technologies
- An uneven pattern of evolution characterizes the growth of ST, which stems from the non-monolithic character of the research communities that have helped spawn them – For example: Here are the components and facets of ST research from 10 years ago

Functional components and facets of ST research

Research Community	Perspectives & Interpretations
Database & Information Systems	Developed conceptual, logical and physical data and process models to capture semantics of information and processes. Focus on efficient & scalable storage, indexing & querying of data, as well as efficient choreography & orchestration of workflows/services
Knowledge Representation	Developed expressive knowledge representation schemes and theories to capture semantics of information and processes in a declarative manner
Information Retrieval	Developed thesauri and taxonomies to capture semantics of information, which are used to guide search and browsing of documents in document collections
Machine Learning & Natural Lang. Processing	Focus on semantic annotations of data and documents with respect to a well-defined set of categories and concepts
Peer-to-Peer	Proposed approaches that use semantic annotations & localized mappings to locate resources [based on semantics of information to support efficient distributed computing], and perform data integration
Agent Systems	Use ontologies to represent both the semantics of the messages exchanged between agents and the protocols followed by a community of agents for performing a set of tasks
Web Services	Proposed process models and ontologies to capture the semantics of services, and to a limited extent, the semantics of computations to enable reuse and interoperability of applications

[Based on Kashyap et al., 2008]

Semantic/ontology spectrum to delineate precision



[Obrst, 2008]

We will resume our discussion at 4:15 pm to further explore how we could focus on a variety of use-cases to demonstrate their value for Earth science …

- Please think about how your own work might contribute towards a use-case for this roadmap

Semantic Technologies Use-Cases

Articulate each use-case in terms of the following:

- Identify semantic technology used (Ontologies, SKOS, etc.)
- Type of domain data, information, and knowledge handled
- Methodological frameworks used
- Software/Tools used
- Implementation examples
- Problems encountered (polysemy, conceptualization, alignment, etc.)
- Solutions applied to address the problems
- Value proposition/benefits
- Quality evaluation and metrics for ontologies

ESIP and Semantic Technologies

- What is ESIP's role in fostering semantic technologies?
- Potential roles and activities that ESIP can support to help strengthen the value of semantic technologies (Governance, protocols, policies, standards, outreach, etc.)