Cross-repository Information Discovery in the Earth Sciences

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EarthCube is an NSF-sponsored, community-led efforts to establish cyberinfrastructures for integrated data sharing, discovery and management across the geosciences.

Conceptual modeling, Information Integration, Interoperability, Formalized vocabulary, Intelligent search, Data publishing support

EarthCube

Cross-repository Information Discovery in the Earth Sciences

OCEANLINK Project

An EarthCube building block focused on ocean science knowledge infrastructure.

Starts with 6 repositories of research vessels data, biological and chemical ocean data, cruise reports, theses, funded awards, conference abstracts.

CHALLENGE Build a centralized framework that preserves heterogeneity amongst the repositories. This has both technical and social aspects.

SOLUTION

• Use extensible Ontology Design Patterns, instead of upper ontology, to model key notions.
• Allow data repositories to define their own alignment to the patterns.

Modeling an Ontology Design Pattern (ODP)

• ODP: a reusable solution to some frequently occurring ontological modeling problem emerging in different domains and can act as a building block.
• Content Pattern: a kind of ODP that encapsulates generic notions within a particular domain of discourse, as a highly modular ontology, axiomatized using some standard language like OWL.
• Content patterns are formulated as a result of an ontology engineering process through intense discussions to find consensus between stakeholders (VoCamp style meeting).
• Manageable ontology engineering process, both technically and socially, as consensus can be reached one key notion at a time, and ontological commitments are kept at a minimum.

A Pattern Example: Oceanographic Cruise

• "Glue" to other patterns in OceanLink.
• Reuse Semantic Trajectory, Simple Event Model and DOLCE's Information Object.
• Formalized as a set of OWL axioms (not displayed here).


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