

Abstract

Informal ontologies can result from the successive extraction of RDF (Resource Description Framework) from XML and then OWL (Web Ontology Language) from RDF. This two-stage extraction affords separate and distinct opportunities for the development of an integrated ontology. Working directly with RDF, resulting integrated informal ontologies are shaped heavily by relationships. The RDF-centric approach also allows inconsistencies and redundancies to be resolved. In contrast, the class/property/individual bias inherent in informal ontologies represented via OWL affords a very different, more traditional perspective for ontology integration. Using a semantic framework developed for the Global Geodynamics Project (GGP), the RDF-centric approach for ontology integration is illustrated. And although this approach is effective and efficient on balance, the incorporation of feature-based annotations illustrates how integrated ontologies may challenge the computational completeness and decidability of the resulting representation in OWL.

Integration of Informal Ontologies

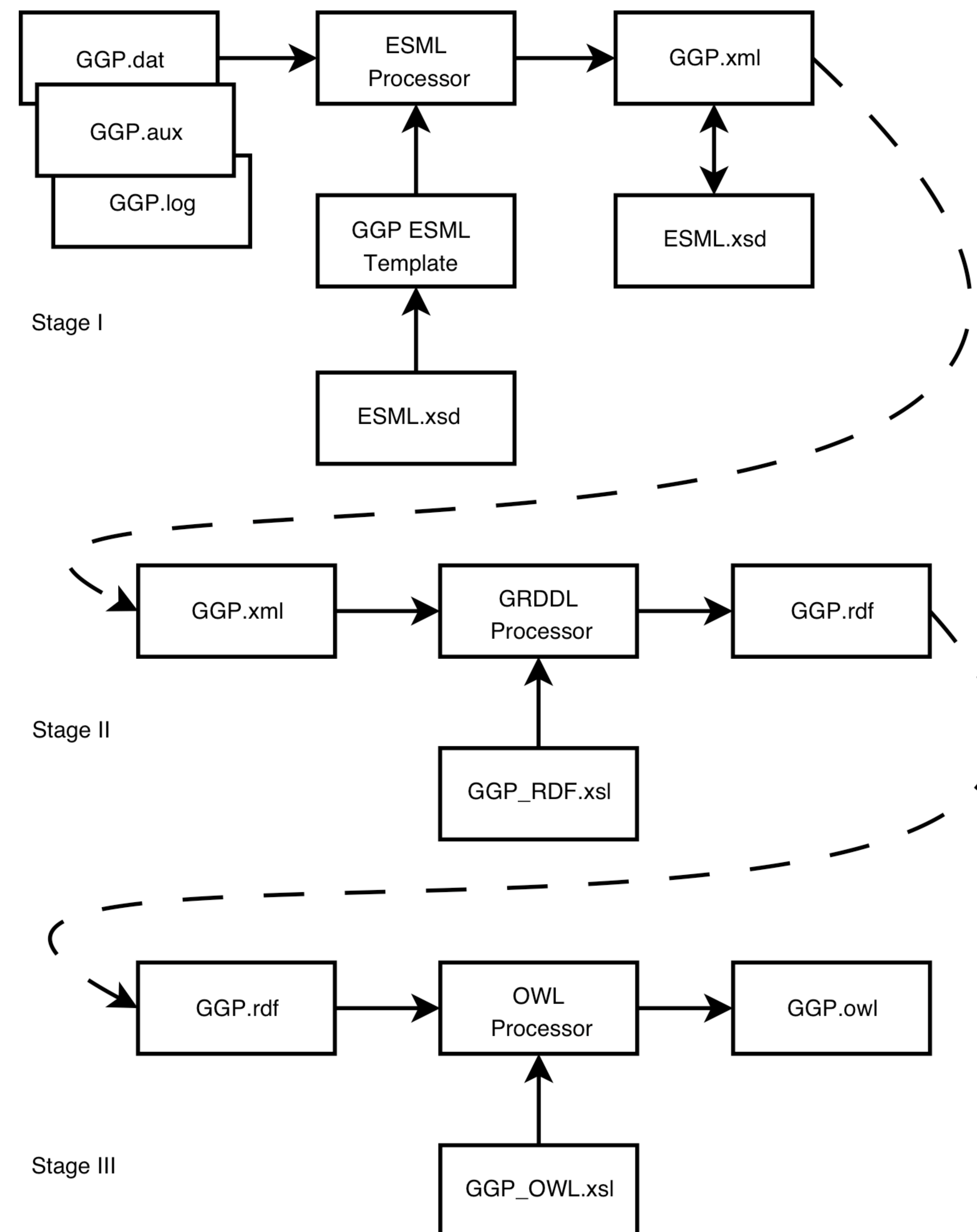
- Data-centric capturing and refinement of relationships
 - Redundancy resolution
 - Multiple instances of the same RDF triple
 - Inconsistency resolution
 - Multiple RDF triples for a single subject
- RDF representation shaping - e.g., RDF collections
- Can be integrated with formal ontologies
 - e.g., using the Dantas and co-workers approach

Glossary

- ESML - An schema-based dialect of XML specifically for the Earth Sciences
- GRDDL - A mechanism for extracting RDF representations from XML
- OWL - Web Ontology Language
- RDF - Resource Description Framework
- SPARQL - RDF query language
- W3C - World Wide Web Consortium
- XSLT - eXtensible Stylesheet Language Transformations

Relationship-Centric Ontology Integration

L I Lumb, J R Freemantle, J I Lederman & K D Aldridge
York University, 4700 Keele Street, Toronto, ONT M3J 1P3, Canada



cf. Integration of Formal Ontologies

- Based on graph manipulation
- Use of an inference engine
- Use of a synonyms dictionary
 - Equivalence relations link concepts and remove incompatibilities
- User-mediated consistency verification
- Queries via SPARQL
- Implementation based on the Jena RDF API
- Can result in a single, global ontology

M. Dantas and co-workers

Conclusions

- Introduce relationships as early as possible
 - Make use of RDF
 - Keep using RDF
 - To transform RDF representations use XSLT
- Extract OWL from RDF as late as possible
 - Dictionaries may not be necessary
- Integration is systemic in the case of informal ontologies

Future Work

- OWL extraction from RDF
 - W3C has a strategy ...
 - Implementation may make use of GRDDL
- External annotations may introduce complications
 - OWL DL may revert to OWL Full
 - No guarantees of computational completeness and decidability
- Large-scale integrated ontologies
 - The ontological approach to joint inversion
 - Data from multiple classes of instruments
 - Application to tsunami research