

# Ontology Design for Information Integration in Disaster Management

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One of the most pressing issues in improving disaster management is that of information integration. With many organizations involved, information exchange is cumbersome due to differing vocabularies and representations both at human language and IT level.

Standardization of terms is often difficult for political and historical reasons, and even where it exists, it usually does not cover IT-level details. Anyhow, in a world of quick technological change, standards will age fast.

In the SoKNOS project, we develop technology that, rather than necessitating standards, is aimed at facilitating the integration of heterogenous information. For this integration, we propose to use formal ontologies. The motivation is threefold:

1. Reasoning over the ontologies provides **superior capabilities in querying for information** (as opposed to a standard SQL-based application).
2. Ontologies **carry more information** than non-semantic schema languages such as XSD. Hence an ontological data schema is less ambiguous, which is of vital importance for the ease of schema mapping.
3. Ontologies are **better suited to serve as reference models**. We suggest to use for the different data schemata not a common standard, but a common *reference model*: a core ontology which each organization may *specialize* to obtain its own data schema. This ensures a large conceptual overlap, and hence greatly facilitates data integration, without enforcing identical vocabularies.

Herein, we address *the design of the reference ontology*. Such design is challenging since absolute clarity is a *must* – semantic ambiguities, let alone conceptual inconsistencies, are likely to cause misunderstandings. To ensure sustainable modeling, we follow the guiding principles of the DOLCE foundational ontology [GGMO03]. Our core contribution is to clarify how those principles are best applied in the domain of disaster management.

## References.

[GGMO03] A. Gangemi, N. Guarino, C. Masolo und A. Oltramari. Sweetening WordNet with DOLCE. *AI Magazine*, 24 (3):13–24., 2003.