

# SEMANTIC SPATIAL DATA INFRASTRUCTURES

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## Abstract

Inspired by Tim Berners-Lee, inventor of the Web and current director of the World Wide Web Consortium (W3C), a group of individuals from the past decade has established methods for representing not just words, but the meanings of words, in a format that machines can understand. This new vision was called 'The Semantic Web' (Lowe, 2005). The Semantic Web brings a new vision and new Web technologies to expand the interoperability of geographic information on the Web and making it machine processable (Brodeur, 2009).

This work has been obtained as part of the project 'Evaluation and strengthening of Spatial Data Infrastructures for sustainable development in Latin-America and the Caribbean' (IDEDES) from the Iberian-American Program of Science and Technology for Development (CYTED).

This poster is aimed to discuss on the possibility to reduce the gap between users and providers of Spatial Data Infrastructures, arguing a new approach based on the Semantic Web. The hypothesis of CYTED IDEDES was formalized as: 'it is possible to reduce the gap between Users and Providers of Spatial Data Infrastructure by including interoperability of meanings'. The Semantic Web and its standards associated allow building user-drive Semantic Spatial Data Infrastructures.

The methodology applied focuses on three basic issues:

- (1) A theoretical framework to define Semantic SDI, adapted of the prior SDI modelling based on the Reference Model of Open Distributed Processing,
- (2) Semantic Framework: combination of ontologies and their relationships, as well as the way they are used to describe software artefacts (e.g., services, data sets, etc.). (Lemmens et al, 2006).
- (1) Geospatial Semantic Services Infrastructure.

As a result, a new approach to Semantic Spatial Data Infrastructure is described, as well as, taxonomy of a Semantic Framework for Sustainable Development and the disaggregation of the Geospatial Semantic Services Infrastructure is shown. The main results of IDEDES Project, including the themes deal in this poster, are compiled into a Book entitled 'Spatial Semantic and Knowledge Discovery for sustainable development'.

The main findings of this poster are as follows:

- A new modelling of Semantic Spatial Data Infrastructures contribute to understand the complexities associated to the expansion of interoperability of geographic information and meanings on the web in a format that machine can understand.
- Being SDIs oriented to SOA, they are aligned to the new specifications of the W3C relative to the Semantic Web.
- A Geospatial Semantic Services Infrastructure can be disaggregated into three core services: Semantic Management Services, Semantic Processing Services and User Interface Semantic Services.
- To facilitate the information discovery in Spatial Data Infrastructures by means of semantic services, the composition and execution of a web geospatial services choreography is illustrated, based on BPEL language.
- It was demonstrated that undertaking Semantic SDIs is a way to bridge users and providers increasing the usage of Spatial Data Infrastructures to solve real problems. Future works should be undertaken to build real scenarios to use Semantic Spatial Data Infrastructures and define new frameworks to strengthen the "social" issues to create bottom up initiatives towards effective Social Semantic SDIs.