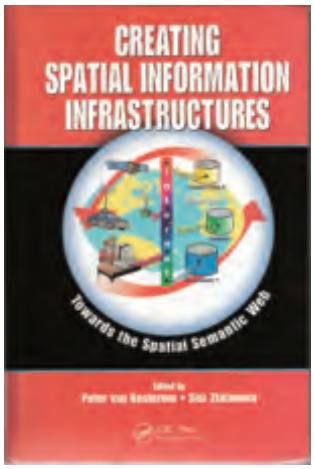
Book Review



Creating Spatial Information Infrastructures: Towards the Spatial Semantic Web

Peter van Oosterom and Sisi Zlatanova (editors)

CRC Press: Boca Raton, Florida, 2008. xxiii and 185 pp., index

ISBN-10: 1420070681; ISBN-13: 978-1420070682

Hardcover: $129.95

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This book, *Creating Spatial Information Infrastructures: Towards the Spatial Semantic Web*, contains a collection of articles around the theme of the semantic aspects of Spatial Information Infrastructures (SIIs). SIIs are an extension to the more commonly termed Spatial Data Infrastructures (SDIs), with the addition of the semantic aspects that turn data into information. The book has its origins in a Bentley-sponsored research seminar with the same title held in London in 2007 and contains some articles based on presentations at that seminar, and some additionally invited articles.

The book focuses on the issue of standardization of semantic representations of geospatial information, presenting this as the best approach to the problem of providing semantic interoperability between heterogeneous web services and data sets within an SII. The greatest emphasis is on developing standards to describe specific geographic themes in terms of their concepts or feature types, which could then be adopted by a range of different users. Such standards would ideally be implemented as semantically-rich ontologies, but most of the examples in the book illustrate relatively semantically-poor Unified Modelling Language (UML) diagrams to describe themes (Gomez-Perez *et al.*, 2004).

A number of the chapters provide examples of current SIIs (at various stages of development) or parts thereof, usually written by the designers and developers of these initiatives and including summaries of: INSPIRE and the process being undertaken to develop that large, European-wide, multi-theme SDI (Chapter 1, Annoni *et al.*); the UK-based NERC Data Grid and the European GMES (Chapter 5, Woolf *et al.*) and the Danish SII (Chapter 11, Overgaard *et al.*). This last chapter is unusual compared to the rest of the book in that it directly addresses the business and organizational aspects of SDI.

A second group of chapters describes various standardization efforts, including a historical summary of standards in the transportation field with a number of different UML diagrams that would be very useful for educational purposes (Chapter 4, Scarponcini); a cadastral (UML) data model developed in the Netherlands and proposed for ISO ratification (Chapter 9, Groothede *et al.*); a framework and set of standards to describe geospatial web services (Chapter 7, Lemmens) and a summary of W3C and OGC standards relating to semantics (Chapter 8, Lieberman *et al.*).

A chapter written by researchers from the UK Ordnance Survey (Chapter 6, Dolbear *et al.*) provides a useful bridge between semantics research and its application in the real world, describing how Ordnance Survey uses semantics and ontologies for their business as a national mapping agency.

Chapter 3 is a most useful chapter containing background summary information to support the rest of the book. It provides a very helpful tutorial in semantics and ontologies with an illustration building from the ground up. This would be ideal as a very simple and brief introduction to the field of geospatial semantics for students or managers. The other background summary chapter tackles the topic of metadata, briefly explaining the relevant standards (Chapter 10, Reuvers *et al.*). Another chapter that seems somewhat out of place relative to the rest of the book addresses geometry semantics, describing the characteristics and mathematics of various types of geometries, both moving and stationary, but also identifying how Computer Aided Drafting data might be integrated in a Geographic Information System.

Overall, the book is an interesting collection of articles emphasising the more practical aspects of SDI over the academic or research aspects, although the latter are also covered in part. It favors the standardization approach to geospatial semantics. Such an approach requires information communities to achieve consensus about the semantic description of a domain and expects others to adhere to that consensus view. The approach also uses structural models like UML and description logics (for example, OWL) to model semantics. This standardization approach has practical benefits and is easily understandable by practitioners following a wave of similar (largely ineffective) standardization efforts for data dictionaries and data models in the 1980s and 90s, but requires a precise, communal and inflexible definition of semantics. The altenative approach to geospatial semantics involves attempting to represent semantics on a more individual level and in a more flexible way, using a wider range of techniques including logic (for example, Bennett *et al.*, 2008; Stock,

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forthcoming). This second approach is currently largely the subject of research and academic work, is not yet widely implemented in real-world situations, and is not mentioned in the book.

The book focuses very much on the technical aspects of SDI (sometimes including non-semantic aspects), with only one chapter (Chapter 11, Overgaard *et al.*) briefly addressing the organizational or management issues. For readers more interested in those aspects of SDI, Williamson *et al.* (2003) may be a suitable alternative. However, neither book comprehensively addresses the organizational and management aspects of SDI semantics specifically, although admittedly this is a narrow topic and one that has not been addressed by research to date.

The chapters themselves are logically-structured and accurate and the book is largely well-written, although there are a few typographic errors. A number of well-presented diagrams and maps are incorporated, including a number of UML diagrams. The authors represent a good cross-section of the current practitioners in the SDI field around the world, with a European bias. The editors are academics and practitioners in the SDI field at Delft University of Technology in the Netherlands. Peter van Oosterom was involved in the development of one of the UML models presented in the book and intended for standardization (Chapter 9, Groothede *et al.*).

The book would be suited to practitioners, students and educators in the SDI field. Few other books address the same subject area, others mainly focussing on either SDI or geospatial semantics, but not both. Various individual journal articles and conference proceedings have discussed the topic previously (for example, Stock *et al.*, forthcoming), but this book is unusual in that it collects a range of such articles in one publication.

In conclusion, the book provides an interesting and useful collection of articles about the standardization approach to SDI semantics, summarizing the development of existing projects and presenting work on existing standards, as well as some other valuable chapters addressing particular aspects of research, implementation and background content relating to SDI semantics.

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