The Role of Service-Oriented Mapping in Spatial and Regional Sciences

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Extended Abstract

By now geoinformation is available everytime and modern maps rule our daily life. Whenever we leave our homes, we have made plans where to go to. If it is a new route we have generally used a map (application). We plan the way to take or evaluate the transport network and its connections. If we feel lost, we take another look in a map and/or try to find reference semantics which will bring us back to our geospatial imagery - our individual mental picture of the world.

At the same time, in our cross-linked world, we produce tons of unstructured data that describe the way we use our environment (nature, things and people). For example: when do we need electricity? For what actions? How much do we consume to what time of the day or in which situation? Does this electricity usage change with our age, education, employment – or any other demographic value? What is the impact of the surrounding topography on our electricity needs? All these questions can be answered by data that we leave with our actions and devices in addition to existing geospatial core data. In order to make use of unstructured data, we have to ask questions which allow for a first requirement analysis and lead to the primary model of data: a first data structure considering our questionnaire requirements. These models are worth distributing because a lot of questions are similar and variety of people could make value out of it. Information about validity, lineage, purpose of creation, recording method, and so on are needed to evaluate the data for specific use cases.

Service-Oriented Architecture (SOA) is the main paradigm to connect and explore everything (Hendriks et al 2012). The metadata are the key to publish available structured data and their accessibility. The access to unstructured information is not well published nowadays and often its access does

ICA European Symposium on CARTOGRAPHY
VIENNA, 10–12 NOVEMBER 2015

Published in "Proceedings of the 1st ICA European Symposium on Cartography", edited by Georg Gartner and Haosheng Huang, EuroCarto 2015, 10-12 November 2015, Vienna, Austria

not follow standardized interfaces. SOA is the main working principle for spatial data infrastructures (SDI), which are the human- and machine accessible catalogs for metadata information. So to say SDI are the publication portals for geospatial content (de Kleijn et al 2014).

At the moment we can observe three generations of SDI, which highlight the shift from product-centered solutions to user-centric SDI approaches (Rajabifard et al 2006, Hennig et al 2011). This user-centric paradigm allows a wider audience, beyond geoinformation experts, to make use of SDI and to leave technical barriers behind.

Spatial and regional sciences observe non visible phenomena in relation to its spatial environment and try to deviate rules. The consequential idea is to support influence on these phenomena. Therefore a successful spatial communication across different expert groups, based on well-understood semantic reference geometries, is needed. The main aim is to transmit any knowledge of observed phenomena and explain its political, regional and structural consequences.

Generally spatial knowledge in regional sciences structures itself in statistical models that embed all kinds of available spatial references. These references are selected according to requirements analysis of the analyzing topic. In addition possible consequences for a region/structure are derived on the basis of these (spatial) models. If the model is restricted in its expressiveness the consequences may be wrong and therefore mislead political, regional and structural decisions.

Service-Oriented Mapping may enhance expressiveness of spatial models for regional sciences due to its wide data accessibility, content actuality, recherchability and appropriate scaling. More accessible data allow to intensify geospatial statistical models. A higher content actuality enhances time quality and even allows for historicized analysis. Recherchability allows for detailed requirement analysis and selection of appropriate sources. An appropriate scaling supports dynamic combinations of data sources and leads to more consistent geovisualization.

This contribution describes a work in progress on the role of Service Oriented Mapping in spatial and regional sciences. Therefore it follows the thesis that specific requirements for the analysis and knowledge transmission in regional sciences exist. These specific requirements could be served by the specific structure of Service-Oriented Mapping.

The requirements of regional sciences as well as the offers of Service-Oriented Mapping will be exemplified on the basis of a case study. Future tasks for the field of Service-Oriented Mapping and its communication issues could be defined from this first requirements analysis and the future perspective of “Service-Oriented regional sciences” could be formulated.

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