SDI-Node to interlink Information, essential for Disaster Preparedness and Management, with other Linked Open Data

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SIGNIFICANCE AND RELEVANCE OF TOPIC

Emergency data and information requirement presupposes that spatial data should be as much updated as possible and easy to access. To face the challenge of rapid and updated data sharing, the use of the internet is largely considered as the most efficient solution, where the field of web mapping is constantly evolving. However, in current praxis (2016), crisis experts who try to find and use data published in Spatial Data Infrastructures (SDI), can get frustrated by the fact that most web services available for spatial data are in fact Web Map Services (WMS) services, which serve static pictures, not data. The implemented SDI-NODE (http://agora-alertas-sdi-node.cloudapp.net/) is a prototype Spatial Data Infrastructure node used to collect and prepare Spatial Information Layers, essential for Disaster Preparedness and Management, enriched with the necessary meta-data, to be interlinked with other Linked Open Data (LOD) sources like DBPedia (Wikipedia) and LinkedGeoData (OpenStreetMap). It promotes hereby the move from 3 (Non-proprietary format) to 5 (Link data to related datasets) star geospatial data envisioned by Tim Berners Lee (2010): ''Link your data to other data to provide context.'' The present research work contributes to answer the following research question: How to efficiently make LOD integrable with Spatial Data Infrastructure (SDI) for Disaster Preparedness and Management?

ABSTRACT

The idea on Linked Open Data (LOD) for Disaster Management was stimulated by the experience with the integration of heterogeneous environmental data based on well-known OGC based web services. A lot of spatial data is available 'via the Web' - but not "really on the web': many datasets can be viewed, queried and downloaded via web services, but it is usually not possible to reference an entity within a dataset, like a web

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page. However, persistent identifiers and deep and reliable linking between datasets and tools are frequently required, beyond file level, to items "within" files. This becomes possible using Semantic Web (SW) technologies, such as the "Resource Description Framework" (RDF), and opens possibilities to integrate or aggregate subsets of datasets based on logical criteria. Ontological modelling is used to represent conceptual knowledge. This SW approach is able to handle SPARQL queries considering property relations and ontological models. Disaster related data is multidisciplinary by nature, and comprises data entities from observations, experiments, surveys, simulations, models, and higher-order assemblies, along with associated metadata. The present work with AGORA´s SDI-NODE focuses on connecting dispersed disaster-relevant data to enable easier and faster discovery and access of disaster-related data. The cloud-based geographical information system is hereby explored in 3 ways: Firstly it serves as a reference implementation for the current state of art in SDI; Secondly it serves as praxis relevant use case for disaster relevant data and information management: it is worldwide developed and earlier versions are already used by many countries for their national disaster preparedness - with regard to its ability in rapid and easy mapping and its flexibility to be quickly adapted to unpredictable and fast changing crisis scenarios, and thirdly because it serves already, "partially", as a SDI-LOD-bridge: The SDI node is composed by underlying components (like GeoServer, GeoNode and GeoNetWork) and some of the supporting communities are already developing different facilities to promote the desired SDI+LOD integration. Thus, the "LOD-enabled SDI-node" explores LOD related technologies to query, integrate and aggregate, over distributed datasets, at feature-level. Final example: The LOD-enabled SDI-Node is a highly appropriate approach and solution to integrate, track, map, catalog and serve information on the ZIKA VIRUS, the AEDES MOSQUITOES and their environmental conditions.

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