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Semantic Web based Mashup of Data Systems for Open Data and Open Science

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Open Data and Open Science are initiatives which provide a framework and rules for openly shared governmental and scientific knowledge. This paper describes our efforts and latest experiments to mashup heterogeneous geo and space science data systems and servers according to Open Data and Open Science concepts based on the semantic web approach. The main focus here is on the mashup of data server designed, implemented and run by three different e(i)-science infrastructure projects, which are the Japanese inter-university IUGONET metadata database, the European Union funded ESPAS platform and the GFZ prototype of a semantic web based ISDC data portal. The intersection of the scientific domains of the projects and related data is the near earth-space area including in-situ and remote geomagnetism observations. The appropriate data systems and servers based on different e-infrastructure solutions are not interoperable. To overcome this disadvantage the design of an interoperable layer upon the used infrastructure based on

- merged domain and terminological models (ontologies)
- transformations of resources into RDF structures, and
- the mashup of linked data resources

has been done in cooperation with the information science department of the university of applied sciences Potsdam. This paper also shows the latest results of our experiments integrating D2R server and services for the mashup of relational database stored resources and the use of the Open Semantic Framework (OSF) for the enhancement of the semantic web based GFZ ISDC prototype.

Abbreviations:
ESPAS - near-Earth space data infrastructure project and data server
IUGOENT - Inter-university Upper atmosphereGlobal Observation NETwork
ISDC - Information System and Data Center
D2R - Relational Database to RDF
OSF - Open Semantic Framework
RDF - Resource Description Framework

Keywords: Open Science, Semantic Web, Linked Data, Ontology, RDF, Interoperability