GEO Label Web Services for Dynamic and Effective Communication of Geospatial Metadata Quality

Victoria Lush (1), Daniel Nüst (2), Lucy Bastin (3), Joan Masó (4), and Jo Lumsden (5)

(1) Aston University, Computer Science, Birmingham, United Kingdom (lushv@aston.ac.uk), (2) 52°North Initiative for Geospatial Open Source Software GmbH, Münster, Germany (d.nuest@52north.org), (3) Aston University, Computer Science, Birmingham, United Kingdom (l.bastin@aston.ac.uk), (4) CREAF, Cerdanyola del Vallès 08193, Barcelona, Spain (Joan.Maso@uab.cat), (5) Aston University, Computer Science, Birmingham, United Kingdom (j.lumsden@aston.ac.uk)

We present demonstrations of the GEO label Web services and their integration into a proto-type extension of the GEOSS portal (http://scgeoviqua.sapienzaconsulting.com/web/guest/geo_home), the GMU portal (http://gis.csiss.gmu.edu/GADMFS/) and a GeoNetwork catalog application (http://uncertdata.aston.ac.uk:8080/geonetwork/srv/eng/main.home). The GEO label is designed to communicate, and facilitate interrogation of, geospatial quality information with a view to supporting efficient and effective dataset selection on the basis of quality, trustworthiness and fitness for use.

The GEO label which we propose was developed and evaluated according to a user-centred design (UCD) approach in order to maximise the likelihood of user acceptance once deployed. The resulting label is dynamically generated from producer metadata in ISO or FDGC format, and incorporates user feedback on dataset usage, ratings and discovered issues, in order to supply a highly informative summary of metadata completeness and quality. The label was easily incorporated into a community portal as part of the GEO Architecture Implementation Programme (AIP-6) and has been successfully integrated into a prototype extension of the GEOSS portal, as well as the popular metadata catalog and editor, GeoNetwork.

The design of the GEO label was based on 4 user studies conducted to: (1) elicit initial user requirements; (2) investigate initial user views on the concept of a GEO label and its potential role; (3) evaluate prototype label visualizations; and (4) evaluate and validate physical GEO label prototypes. The results of these studies indicated that users and producers support the concept of a label with drill-down interrogation facility, combining eight geospatial data informational aspects, namely: producer profile, producer comments, lineage information, standards compliance, quality information, user feedback, expert reviews, and citations information. These are delivered as eight facets of a wheel-like label, which are coloured according to metadata availability and are clickable to allow a user to engage with the original metadata and explore specific aspects in more detail. To support this graphical representation and allow for wider deployment architectures we have implemented two Web services, a PHP and a Java implementation, that generate GEO label representations by combining producer metadata (from standard catalogues or other published locations) with structured user feedback. Both services accept encoded URLs of publicly available metadata documents or metadata XML files as HTTP POST and GET requests and apply XPath and XSLT mappings to transform producer and feedback XML documents into clickable SVG GEO label representations. The label and services are underpinned by two XML-based quality models. The first is a producer model that extends ISO 19115 and 19157 to allow fuller citation of reference data, presentation of pixel- and dataset- level statistical quality information, and encoding of 'traceability' information on the lineage of an actual quality assessment. The second is a user quality model (realised as a feedback server and client) which allows reporting and query of ratings, usage reports, citations, comments and other domain knowledge.

Both services are Open Source and are available on GitHub at https://github.com/lushv/geolabel-service and https://github.com/52North/GEO-label-java. The functionality of these services can be tested using our GEO label generation demos, available online at http://www.geolabel.net/demo.html and http://geoviqua.dev.52north.org/glbservice/index.jsf.