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# OWS Context Composition of from Metadata for Online Geoprocessing and Modelling

Alexander Kmoch

University of Tartu, Institute of Ecology and Earth Sciences, Department of Geography, Tartu, Estonia (alexander.kmoch@ut.ee)

We present an open-source standards-based web application framework that links distributed data like field observations and internet-based environmental data, with research publications and online modelling and processing services. In order to better support water resources planning and decision making we needed to bundle the available extensive and widely scattered hydrological and geo-scientific data, models and unstructured information from scientific reports and articles. For that we developed a web-based infrastructure around the conceptual model of Open Geospatial Consortium (OGC) Web Services Context Document (OWS Context). It comprises of an Indexer that ingests metadata records from many CSW catalogues and transforms the retrieved metadata (with special focus on ISO Data Distribution and Online Linkage elements) into OWS Context features that can be queried, selected and bundled into OWS Context documents. As there is currently no specification for an OWS Context feature store we implemented a simple RESTful storage service through which OWS Context collections (in GeoJSON encoding) can be stored, updated, retrieved and deleted. Users can also upload their own data files and metadata records which in turn will be referenced in their OWS Context collections. A web application provides a user interface in order to interact with the indexing and OWS Context storage services.
Secondly, we evaluated the suitability of OWS Context as descriptive data encapsulation format for use within a Web Processing Service (WPS) environment. With the release of OGC WPS 2.0, OGC SensorML is a supported description format for WPS process parameters. We compared describing a hydrological modelling process – which requires many different inputs – in classical WPS XML format, in SensorML2.0 as suggested for WPS 2.0 and with OWS Context as a logical container of all data that should be sent (by reference) to the software process that remote-controls and executes the modelling software. SensorML and Sensor Web Enablement (OGC SWE) components provide more complex data in- and output descriptions than WPS XML and can be easily interlinked with Linked Data Vocabularies for semantic enrichment. Furthermore, SensorML can also reference chained WPS requests (i.e. their expected results thereof) as data inputs. OWS Context provides similar mechanisms to annotate features with category types and can use a chained WPS request as an OWS Context feature (with pre-defined request definition). Furthermore, we show how we seamlessly propagate feature-level metadata via the OWS Context, and thus, improve workflow composability and reproducibility.
The operational infrastructure runs on the Google Kubernetes Engine as a group of Docker containers, which are orchestrated via the Kubernetes API and uses Google Cloud storage capabilities. WPS allows distributed and chained processing in the web. So we can extend computations easily within the cloud computing infrastructure. Furthermore, the reference of large data from cloud storage on the same platform drastically reduces network transfer latency and overhead.