OGC and Environmental Information Systems

Fundamental research in engineering geology and hydrogeology cannot be performed adequately without appropriate data management. Hence one important research topic deals with the design and implementation of environmental information systems.

Web Services

As a research facility in Earth and Engineering Sciences we aim to provide solutions to geo-technical and environmental problems such as landslide risk assessment, groundwater vulnerability assessment, re-cultivation of abandoned industrial sites, and evaluation of construction ground or improvement of soils. In all cases, decision-making and solution concepts are based on spatial information built upon huge amounts of geodata. While in the past geodata was held locally on specialised workstations, today the department is developing an organisational Spatial Data Infrastructure using implementations of OGC Web Services, mainly the OpenGIS Web Feature, Web Coverage, and Catalogue Services specifications. Providing data via OGC Web Services has some great advantages: the data becomes easily available to the whole organisation, even though resident on different computers. After updating data, changes are published and immediately available. Further, catalogue services make it possible to obtain a quick overview of the data available in the department.

Standardised and Open

One current research project, Web-based assessment of groundwater vulnerability, generates information from distributed, heterogeneous geodata and makes extensive use of OGC's Web Coverage Service to provide the base data. In addition, the project takes advantage of servers that are part of the Spatial Data Infrastructure North Rhine Westphalia (a federal state of Germany) and which implement the OpenGIS Web Map Services Specification. This enables access to map images from many regional sources. To help us encapsulate processing capabilities for the project our department participated in an OGC Interoperability Experiment for definition of a Web Processing Service (WPS) specification providing a standard way to expose geospatial mathematical calculations in Web service interfaces. Integrating this specification into the research project enabled us to make processing capabilities and data available in a standardised and open fashion.

Core Competencies

Our work with the WPS provided a great opportunity to port some of our know-ledge to Web-based systems: former GIS-based processing routines can now be exposed in a Spatial Data Infrastructure or as stand-alone and self-describing processing services. WPS allows the extensive re-use of algorithms and information-generating routines and eases system implementation. By combining several processing services, more complex geospatial solutions can be provided. The service approach enables more efficient use of data, greater interoperability and reusability of geodata, and thus reduces costs. The ease of developing Web-based environmental information systems allows us to concentrate on our core competencies: research in engineering geology and hydrogeology.

https://www.gim-international.com/content/article/ogc-and-environmental-information-systems