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Exposing snow melt models as geoprocessing services

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The field of hydroinformatics is rapidly gaining momentum due to both the increasing stress on global water resources (Cheng et al. 2006; Hughes and Forsyth 2006, Olivera et al. 2006, Soh et al. 2006) and the increasing offer of informatics tools accessible over Internet. This field integrates scientists' knowledge and understanding of water resources with applications and technology to improve decision-making in critical contexts such as runoff prediction in major drainage basins. Scientists as hydrologists have specific and concrete requirements that make them to keep carrying out time-consuming tasks for capturing, analyzing and processing huge volumes of hydrological data by using traditional tools. Recent advances in the fields of web services, especially as applied to geoprocessing tasks, can facilitate this access and data fusion workflow, including the wrapping of scientific algorithms for on-line parameterization and execution (Díaz et al. 2006).

We present a web-based approach for supporting snow melt models for predicting runoff for gauged drainage basins derived from the observed snowmelt data by using as inputs data from both in situ observations and EO (Earth Observation). Compared to local-processing or desktop applications our approach is based on a distributed model composed of independent and specialized geoprocessing services (Schut, 2007) –geospatial web services that perform geospatial processing tasks over the Internet– that each take on, or assist, a part of the geoprocessing workflow for snow melt models. Our system includes analysis and GIS functions commonly used by environmental

scientists.

The highly distributed web services model is such that geospatial data are loosely coupled with the underlying systems used to create and handle them, and geospatial processing functionalities are made available as remote, interoperable, discoverable geospatial services. Such building-block services can be then discovered, aggregated, published, reused, and invoked using standard protocols and specifications, independently of any specific technology. This approach is perhaps best represented by the Spatial Data Infrastructure (SDI) paradigm and the INSPIRE directive, in which standardized interfaces are the key to allowing geographic services to communicate with each other in an interoperable manner.

Our approach takes place in the Alps using snow melt models for predicting runoff in the Alpine basins, a pilot scenario described in the framework of the AWARE Project (Rampini et al. 2006; http://www.aware-eu.info). Two hydrologic models have been tested, one follows the HBV, second the SRM model structure. The resulting Geoportal application exposes the snow melt models used as a combination of web forms (user interface) and a set of controlled web processing services running remotely.

References

Díaz, L., Costa, S., Granell, C. & Gould, M. 2007. Migrating geoprocessing routines to web services for water resource management applications. Proceedings of the 10th AGILE Conference on Geographic Information Science. Aalborg, Denmark, May, 2007: 1-9.

Hughes, D.A., Forsyth, D.A.: A generic database and spatial interface for the application of hydrological and water resource models. Computers & Geosciences 32 (9) 1389-1402 (2006)

Cheng, Q., Ko, C., Yuan, Y., Ge, Y., Zhang, S.: GIS modeling for predicting river runoff volume in ungauged drainages in the Greater Toronto Area, Canada. Computers & Geosciences 32 (8) 1108-1119 (2006)

Olivera, F. Koka, S., Nelson, J.: WaterNet: a GIS Application for the Analysis of Hydrologic Networks Using Vector Spatial Data. Transactions in GIS 10 (3) 355-375 (2006)

Rampini, A., de Michele, C., Lehning, M., Blöschl, G., Brilly, M., Llados, A., Sapio, F., Gould, M. 2006. AWARE: A tool for monitoring and forecasting Available Water REsoruce in mountain environment. Geophysical Research Abstracts 8 (10780).

Schut P (ed) (2007) OpenGIS Web Processing Service Version 1.0.0, Open Geospatial Consortium

Soh, L.-K., Samal, A., Zhang, J.: A Task-Based Approach to User Interface Design for a Web-Based Hydrologic Information System. Transactions in GIS 10 (3) 417-449 (2006)