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Modelling noise propagation using Grid Resources. Progress within GDI-Grid

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Modelling noise propagation using Grid Resources. Progress within GDI-Grid.

GDI-Grid (english: SDI-Grid) is a research project funded by the German Ministry for Science and Education (BMBF). It aims at bridging the gaps between OGC Web Services (OWS) and Grid infrastructures and identifying the potential of utilizing the superior storage capacities and computational power of grid infrastructures for geospatial applications while keeping the well-known service interfaces specified by the OGC. The project considers all major OGC webservice interfaces for Web Mapping (WMS), Feature access (Web Feature Service), Coverage access (Web Coverage Service) and processing (Web Processing Service). The major challenge within GDI-Grid is the harmonization of diverging standards as defined by standardization bodies for Grid computing and spatial information exchange. The project started in 2007 and will continue until June 2010.

The concept for the gridification of OWS developed by lat/lon GmbH and the Department of Geography of the University of Bonn is applied to three real-world scenarios in order to check its practicability: a flood simulation, a scenario for emergency routing and a noise propagation simulation. The latter scenario is addressed by the Stapelfeldt Ingenieurgesellschaft mbH located in Dortmund adapting their LimA software to utilize grid resources.

Noise mapping of e.g. traffic noise in urban agglomerates and along major trunk roads is a reoccurring demand of the EU Noise Directive. Input data requires road net and traffic, terrain, buildings and noise protection screens as well as population distribution. Noise impact levels are generally calculated in 10 m grid and along relevant building facades. For each receiver position sources within a typical range of 2000 m are split down into small segments, depending on local geometry. For each of the segments propagation analysis includes diffraction effects caused by all obstacles on the path of sound propagation.
This immense intensive calculation needs to be performed for a major part of European landscape. A LINUX version of the commercial LimA software for noise mapping analysis has been implemented on a test cluster within the German D-GRID computer network. Results and performance indicators will be presented.

The presentation is an extension to last-years presentation “Spatial Data Infrastructures and Grid Computing: the GDI-Grid project” that described the gridification concept developed in the GDI-Grid project and provided an overview of the conceptual gaps between Grid Computing and Spatial Data Infrastructures. Results from the GDI-Grid project are incorporated in the OGC-OGF (Open Grid Forum) collaboration efforts as well as the OGC WPS 2.0 standards working group developing the next major version of the WPS specification.