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Different kinds of gridification of OWS - Theoretical approach and practical example

A. Krüger (1), B. Baranski (2)

(1) Institute for Geodesy and Geoinformation Science at Technische Universität Berlin, Germany, krueger@igg.tu-berlin.de (2) Institute for Geoinformatics at University of Münster, Germany, bastian.baranski@uni-muenster.de

The first part of the presentation will illustrate thoughts of different kinds of gridification. There an approach of formalisation of interaction between spatial data infrastructures (SDI) and the grid, used as two geospatial networks, will be presented. The second part of the presentation will show a live-demo of a Grid-enabled OGC Web Processing Service (WPS).

Within the scope of computation large amounts of data and complex calculations the use of grid computing is a good choice for achieving high performance, because the processing of very extensive spatial data can be very computationally intensive. At the moment there exist the SDI as a network with use of special web services, which are standardised at the OGC for building and processing service chains in geospatial context. SDI and grid environments can be understand as two networks, which permit processing of geospatial service chains. In this context three different possibilities can be identified to map calculations of SDI service chains into a grid environment and connecting both networks, on the one hand to maintain the SDI structure and on the other hand to get an optimal using of a grid environment.

A first approach of gridification can be done by redundant mapping of service chains into a grid environment, where every SDI service will be embedded into a grid service. Another approach is the encapsulated gridification, where the SDI service chain will be persisted. There every service will be independent gridifified by grid instances. On the instances the calculation will be parallel processed, collected and delivered at

the SDI side. Third there is a transcendental gridification, where every service will be mapped into grid instances at a harmonised way of parallelisation. The data transfer between services will be parallel realised by grid instances. Thus the partitioning of data can be taken in the whole service chain while the SDI chain structure can persist. All these approaches have pros and cons dependent on equivalences in parallelising needs between services of a chain. If there are equivalences the transcendental gridification is a complex solution but can avoid bottlenecks, provide an optimal use of grid infrastructure and the SDI look and feel can persist for the user.

The OGC's Web Processing Service (WPS) specification defines a standardized interface to publish and perform geospatial processes over the web. Such a process can range from a simple buffer calculation to a complex process of vector analyses for generalization purposes. As wrote before, within the scope of computation large amounts of data and complex calculations the use of grid computing is a good choice for achieving high performance. The selected demo scenario in the second part of the presentation aims at producing an automated model to generate a map which indicates recent fire threats to transport infrastructure. The presented grid-enabled 52° North WPS will show, that distributing the calculation jobs over the grid could easily be done and improve the performance almost in every cases.