Title: Towards interoperable 2D- and 3D geoprocessing functions in SDI - Using the OGC® based deegree WPS in GIScience

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The evolution of Spatial Data Infrastructures (SDI) has shown the necessity of analyzing, converting and processing 2D data in a standardized manner. For analyzing and processing geographic information trough Web Services the Open Geospatial Consortium (OGC) has defined the Web Processing Service (WPS) specification [1]. The deegree framework supports this specification already since version 0.4. [0]. The Research Group Cartography of the Department of Geography of the University of Bonn has set up a deegree2 based Web Processing Service. At present over 20 generic and complex processes had been implemented and installed therein. A generic WPS-client has been developed, useable with any WPS instance [2]. It delivers not only an interface for a general survey of all processes and their specific operation handling, but also example input data. Those are partitioned into four categories. The “Basic” processes are specialized in handling vector data. For example like buffering of GML geometries by Buffer, or joining of points inside polygons by the spatial predicate “contains” in PointInPolygonJoins process. The second are the raster based processes. For instance an Aspect or Slope estimation of an input GeoTIFF based on a digital elevation model, or estimation of the annual direct solar radiation via SolarRadiation [3]. Thirdly, the complex are processes required for several project-specific services e.g. the consecutively chaining of a point buffering and point in polygon join by ChainBufferPointInPoly [4]. Finally the 3D processes consequently follow the general development in SDI from 2D- towards 3D processing [5]. Inside the ToxicGasScenario3D a 3D sphere, on the basis of a gas leakage location, is calculated. This includes actual wind speed and direction, taken from an OGC Sensor Observation Service (SOS), visualizing where the gas will be within the next hour. Secondly BombThreatScenario3D similarly computes a 3D sphere. But in this scenario, the representing area shows where all people should be evacuated before the bomb is disarmed [6]. Within the project GDI-GRID several similar WPS processes are distributed in a computing grid in order to speed up the processing time. This includes the processing of Digital Elevation Models (DEM) [7] and in the future the calculation of evacuation simulations. In the outlook a preview of our planned work in the domain of environmental modeling using OGC® WPS will be given.

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