Geophysical Research Abstracts
Vol. 12, EGU2010-10579, 2010
EGU General Assembly 2010

User-driven generation of standard data services

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Geospatial Information systems are experiencing the shift from monolithic to distributed environments (Bernard, 2003). Current research trends for discover and access of geospatial resources, in these distributed environments, are being addressed by deployment of interconnected Spatial Data Infrastructure (SDI) nodes at different scales to build a global spatial information infrastructure (Masser et al., 2008; Rajabifard et al., 2002).

One of the challenges for implementing these global and multiscale SDIs is to agree with common standards in consideration with heterogeneity of various stakeholders [Masser 2005]. In Europe, the European Commission took the INSPIRE initiative to monitor the development of European SDIs. INSPIRE Directive addresses the need for web services to discover, view, transform, invoke, and download geospatial resources, which enable various stakeholders to share resources in an interoperable manner [INSPIRE 2007]. Such web services require technical specifications for the interoperability and harmonization of their SDIs [INSPIRE 2007]. Moreover, interoperability is ensured by a number of specification efforts, in the geo domain most prominently by ISO/TC 211 and the OpenGIS Consortium (OGC) (Bernard, 2003).

Other research challenges regarding SDI are on one hand how to handle complexity by users in charge of maintaining SDIs as they grow, and on the other hand the fact the SDI maintenance and evolution should be guided (Bejar et al, 2009). So there is a motivation to improve the complex deployment mechanisms in SDI since there is a need of expertise and time to deploy resources and integrate them by means of standard services. In this context we present an architecture following the INSPIRE technical guidelines and therefore based on SDI principles. This architecture supports distributed applications and provides components to assist users in deploying and updating SDI resources.

Therefore mechanisms and components for the automatic generation and publication of standard geospatial are proposed. These mechanisms deal with the fact of hiding the underlying technology and let stakeholders wrap resources as standard services to share these resources in a transparent manner. These components are integrated in our architecture within the *Service Framework* node (module).

Figure 1: Figure 1. Architecture components diagram

Figure 1 shows the components of the architecture: The Application Node provides the entry point for users to run distributed applications. This software component has the user interface and the application logic. The Service Connector component provides the ability to connect to the services available in the middleware layer of SDI. This node acts as a socket to OGC Web Services. For instance we appreciate the WMS component implementing the OGC WMS specification as it is the standard recommended by the INSPIRE implementation rules as View Service Type.The *Service Framework* node contains several components. The Service Framework main functionality is to assist users in wrapping and sharing geospatial resources. It implements the proposed mechanisms to improve the availability and visibility of geospatial resources. The main components of this framework are the *Data wrapper*, the *Process Wrapper* and the *Service Publisher*. The Data Wrapper and Process Wrapper components guide users to wrap data and tools as standard services according with INSPIRE implementing rules (availability). The Service Publisher component aims at creating service metadata and publishing them in catalogues (visibility). Roughly speaking, all of these components are concerned with the idea of acting as a service generator and publisher, i.e., they get a resource (data or process) and return an INSPIRE service that will be published in catalogue services.

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