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## **C5.159 Report on functional and technical requirements for extended geoplatform functions**

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<b>Dissemination Level</b>		
<b>PU</b>	Public	X
<b>PP</b>	Restricted to other programme participants (including the Commission Services)	
<b>RE</b>	Restricted to a group specified by the consortium (including the Commission Services)	
<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	

This report presents functional and technical requirements for extended EDIT Geographical platform functionalities and scientific modules (taxonomic, morphological, phylogeographical, paleontological). It was compiled by Marcin Gąsior with a generous input from Patricia Mergen, James Davy and Franck Theeten and the colleagues from the EDIT developer mailing list.

## **Introduction**

The Work Package 5.4 aims at providing a comprehensive, robust, intuitive platform to support scientific studies respecting international standards, but without burdening the user with technical details. The integrated framework tools – the EDIT MapViewer and the EDIT Map REST Service – are intended to offer services useful for taxonomic research that is providing the instruments for taxonomists to perform geographical analysis and interpretation, and to prepare the result for publication.

The EDIT MapViewer – an easy to use, online mapping service – is a handy tool for taxonomists working with their own data. Its modular construction allows adding new modules and functionalities which appear to be needed. During the EDIT project period, new demands emerged and some initial requirements were not satisfied. These issues can be implemented in the future.

## **Scientific modules**

– The taxonomic module should include functionalities of enhanced inventory (spatial) completeness analysis, gap analysis and basic species distribution modelling algorithms. Inventory completeness analysis function and gap analysis are already implemented in a limited scope in the current version of the MapViewer. It should be refined, enhanced by new calculations and made available for areas smaller than 1 degree quadricle.

Species distribution modelling is nowadays an area of high interest for taxonomists. Using specimen sampling locations in conjunction with environmental information, one can estimate habitat suitability and search for potential sampling regions.

– The morphological module should contain methods applied by *geometric morphometrics* which assesses the distribution of “landmarks” – points described by a tightly defined set of rules. In combination with geographical datasets, this would allow to determine distribution of morphological variants of a same taxon or of related taxa.

– The phylogeographical module should allow studying the historical processes that may be responsible for the contemporary geographic distribution of individuals. This can be accomplished by considering the geographic distribution of individuals in light of the patterns associated with a gene genealogy.

Both the phylogeography and detection of morphological variants by geospatial regions are considered as adequate services to assist taxonomists in their revisions of taxa or descriptions of new taxa.

– The paleontological module should provide plate tectonics maps as well as geological maps. Moreover, the EDIT partners are requested to link WMS geological layers of their projects (GNOSIS, Onegeology) with the MapViewer and use its functionalities.

### **Requirements for enhanced functionality**

Functionality to upload user defined shapefiles (vector maps) via the REST Service and automatically register them to the WMS and display as a layer. A test prototype had been made by combining the “webfm” module of Drupal and the optional (and in development) REST interface of GeoServer, but was too unstable for being put into production.

Additional background layers for more informative maps production. The missing areas should be covered; this is oceans and seas for marine species mapping. Recently the NOAA ETOPO1 Raster image of the Earth and several Vmap0 layers have been uploaded into the EDIT WMS and underlying PostGIS database, but they are not available for the whole Globe.

Improved cartographic capabilities through the tools that allow the user design or change the style (coloring, line properties) of the layer (especially of imported shapefiles) as well as define customized legend. The development of such tools, based on OGC XML standards, requires building a specific interface and can be done in the extended EDIT project. Moreover, the Projections module should be enhanced to use broaden set of predefined projections, but also offer the possibility to change projections parameters to better suit specific areas.

More functional Map REST Services (points.php and areas.php) should establish interactive user interface and allow querying metadata when clicking on a point and introducing zooming and panning capabilities. The REST Services cannot directly offer these functionalities as they return a static image in PNG format, but provide the description in JSON format of the underlying URLs of the base WMS layers and legends. These URLs than can be integrated with JavaScript application such as OpenLayers. The example websites are: <http://wp6-cichorieae.e-taxonomy.eu/portal/> and <http://www.palmweb.org/>.

### **Geoplatform sustainability**

There is users request for the EDIT Geographic platform services to be part of the EDIT platform Open Source community, with a network of high availability servers, redundancy, mirroring and using virtual machines.

It is also planned to set up a developer community which members would implement new functions, enhance the system and fix reported bugs. The Concurrent Version System (CVS) would be used to work on the code jointly, instantly share the achievements and avoid forking of the developments.

### **Collaboration with partner institutions**

There is an interest from several institutions (i.e. MNHN, Bonn, CSIC, Kew, Berlin, Estonia) to host mirrors of the EDIT Geoplatform services or at least to use them. Some larger initiatives would also like to use the Map REST Services or some features of the MapViewer to enhance their GIS services, that is: *GBIF* (<http://www.gbif.org/>) – mainly the REST Services, *AQUAMAPS* (<http://www.aquamaps.org/>) and *GROMS* (<http://www.groms.de/>) – both the REST Services and the MapViewer features.

### **Conclusions**

During the lifetime of the EDIT project the Geographic platform was under constant development as the user needs and available technology were changing. After several years the solid construct of the platform with basic functionalities is widely known and used.

Enhanced functionalities and additional modules would surely make the Geoplatform more useful, convenient and reliable. Therefore it is vital to continue its development beyond the EDIT project period.