

Final Report

“Contract for providing technical support for development EEA/EC WISE compliant web-based GIS database system for selected pilot basins of the EPIRB beneficiary countries - Phase Two”

Prepared by: Lyubomir Filipov, Senior GIS Expert, GAP Consult Ltd.

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1 Introduction

The project entitled “Contract for providing technical support for setting the ICPDR compliant standardized GIS data-base system (the Danube GIS format) for selected pilot basins of the EPIRB beneficiary countries - Phase Two”.

The project is effective on this 15th of January 2016.

This report is dealing with summarization of all activities performed under the contract.

2 Main activities

All key project activities as defined by the ToR are completed:

1. Update GIS DBs for biological, hydro-morphological and physico-chemical protocols based on the 2014 and 2015 field surveys.

Activities: all new data from 2014 and 2015 field surveys is evaluated, systemized and included into the final version of the server database. Data reports for each country were produced, highlighting the evaluated data, mistakes found, etc. Based on the feedback all errors were reflected into the final database system.

2 Setup server environment, based on PostGIS/GRE, Geoserver, Geonode/OpenLayers and other technologies, as necessary.

Activities: the initial setup of the system was done on the consultant own cloud based infrastructure (Amazon EC2), were all necessary test, setup and configuration was performed. After the purchase of the cloud virtual server all architecture was replicated on the production server, with the latest version of all components. The system architecture include the following setup:

- Operating system: Ubuntu Linux Server 14.04

- DBMS: Postgre SQL 9.3 / PostGIS 2.1
 - Web Server: Apache Tomcat 7
 - Application GIS server: Geoserver 2.5.1 (<http://geoserver.org/>)
 - Geospatial SDI platform: Geonode 2.4 (<http://geonode.org/>)
 - Metadata platform: PYCSW (<http://pycsw.org/>)
 - Desktop GIS software: QuantumGIS (<http://www.qgis.org/>)
 - The system is physically located on a cloud based infrastructure on a <https://www.leaseweb.com/> virtual server.
- 3 Create catalog of web services and metadata catalog.

Activities: the services catalog was created based on the ICPDR data templates for each country and it includes 95 web services at the moment, based on Open Geospatial Consortium (OGC) Web Map Service (WMS) and Web Feature Service (WFS) standard. The web service catalog is available at: <http://185.17.144.169:8080/geoserver/geonode/ows?> . The web service catalog can be accessed through any desktop GIS (e.g. QGIS¹ or ArcGIS Desktop²) or web based system. The catalog provides access to the Web Map Services and Web Feature Services, created on the web platform.

Each service has metadata, based on abstract, geometry type, keywords and INSPIRE based layer category. The metadata catalog is based on OGC CWS and available at: <http://185.17.144.169/catalogue/csw?service=CSW> . The metadata catalog can be accessed

¹ <http://www.qgis.org/en/site/>

² <http://www.esri.com/software/arcgis/arcgis-for-desktop>

through a web based system for harvesting the metadata (e.g. Geonetwork³, Ckan⁴, Deegree⁵, etc.).

4 Customize basic map viewer: set up the platform in two key languages: English/Russian, customize options to download data, etc.

Activities: Platform is available at: <http://185.17.144.169/> with numerous map viewers for each country, build around main ICPDR maps (e.g. Surface water bodies, ground water bodies, etc.). Main interface of the platform is available on English and Russian languages. Elaborated system for sharing and data permission is created with options to allow data download.

5 Upload data (e.g. Shapefiles) for storage on the server and automatic creation of web services; integrate web services in web application.

Activities: all shapefiles are uploaded on the server database management system - at the moment there are 583 database layers. Selected layers (based on ICPDR templates) are created as a web services and integrated into number of web applications.

6 Publish and share web application on different levels.

Activities: total of 37 web applications were created for different level (e.g. For each country and thematic topic).

7 Continuous quality assurance, additional option for independent (external) QA GIS expertise for final data validation.

Activities: all data were reviewed and tested, all loaded data were independently review and tested, as well as all web services and maps.

³ <http://geonetwork-opensource.org/>

⁴ <http://ckan.org/>

⁵ <http://www.deegree.org/>

8 Data documentation and reporting for the detailed administration guide of the system maintenance and data upload.

Activities: the system contains the following guides - uses guide with all step by step instruction on system usage, screen shots and explanations.

9 Train responsible institutions for general usage and maintenance of the platform.

Activities: A two day workshop (25-26.07.2016) was held in Minsk, Belarus. Detail training program and presentation was created for the workshop training for all countries, covering introduction to GIS topics, standards, web GIS and open data terminology, WISE/ICPDR reporting requirements, system platform, etc.

10 In collaboration with the Project stakeholders and partners investigate possibility of transferring the central web-based EPIRB GIS data-base to the third party, i.e. to the follow-up water project, SEIS-2, JRC Data Center (the Prut meta-data for the Danube DRDSI service), any other.

Activities: the discussion on system sustainability was discuss on email/skype basis with deputy project manager as well as on the training workshop. At the time of the report writing the system hosting is prepaid for one year term, with upcoming discussion on follow up project to take over the ownership of the portal.

11 Produce the detailed documentation and procedures for transferring web based GIS data-base to the identified third party.

Activities: detailed documentation and procedures for transferring the web based GIS to other party was provided in the form of administration guide and is uploaded on the server for admin level users. The document contains all the credentials for successfully system back up and restore to another server.

3 Delivery of the final product

Final version of the web portal is available at: <http://185.17.144.169/>

(all training and exercise data, web services and web maps, created during the workshop was removed).

User guide, training program and training presentation as attached with the delivery of this report.

Administrator's guide is uploaded on the system and due to security reasons, containing system credentials cannot be delivered via email. Administrator's credentials are provided to deputy-project manager on site, during the workshop.

4 Proposal for follow up activities

- **Capacity building:** many of the workshop participants expressed interest in variety of topics: spatial database, desktop GIS (both Quantum GIS and ArcGIS), spatial modeling (e.g. Flood modeling) and spatial analysis (attribute and spatial queries), web based GIS products development and administration. These variety of topics cannot be covered in details due to short amount of time, nevertheless the participant's interest can be used to further develop the capacity in all six countries for spatial database and web GIS management, open data initiatives, enhanced water management decision management, etc. We strongly recommend a capacity building component in the above mentioned topics to be included in the follow up project.
- **Maintenance of the cloud server platform:** there must be ongoing payment on the selected cloud server platform (or equivalent) in order to ensure system availability as the platform will be available until June, 2017. Prompt actions must be taken in order to ensure system transfer to another location or continuous payment to current cloud server provider.

- **Continuous support, system maintenance and enhancement:** this activities might include the following functionality:
 - System monitoring and maintenance on a regular basis, including operating system updates and security; database and web based system performance and optimization; database layers, services, web maps and metadata monitoring;
 - Core database system and web system updates with new versions in order to include new functionality;
 - Future development of the system, including analytic extensions for water management, mobile components for field data collection or citizen science involvement, etc.