23 June 2017

Original: English

Eleventh United Nations Conference on the Standardization of Geographical Names
New York, 8-17 August 2017
Item 12 (b, c) of the provisional agenda*
Toponymic data files and gazetteers:
Data management and interoperability;
Data services, applications and products (for example, gazetteers and web services).

Status Report on the GeoLocator Service developments under European Location Services

Submitted by Germany**

* E/CONF.105/1

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Background

EuroGeographics, the association of European Mapping and Cadastral Authorities, continuously develops solutions to pan-European users for operating with geographical names and other related spatial information. EuroGeoNames (EGN) service has been arranged in 2012. It provided the combined geographical name services from 17 National Mapping and Cadastral Authorities (NMCAs), members of EuroGeographics. EuroGeoNames offered authoritative data and includes official exonyms and variant names representing the 25 languages of the EU.

In 2013-2016 the EGN service was accommodated to the newly designed GeoLocator service as a part of European Location Framework (ELF) project (www.elfproject.eu) co-funded by European Commission under the Information and Communication Technologies (ICT) Competitive and Innovation (CIP) programme [1]. In addition, or instead of the available EGN data the national INSPIRE compliant services of geographical names, administrative units and addresses were linked to the GeoLocator opening the additional operational capacities for users. Also, the EGN database of exonyms and variant names was revised, further populated and integrated to the GeoLocator.

As a practical example of INSPIRE implementation, the ELF Project has supported the delivery of national web feature services and provided valuable feedback on the data specifications as they are implemented in different countries. This work is now helping others to meet INSPIRE requirements [2]. It has delivered the technical infrastructure to incorporate 19 themes of authoritative data content into an application environment, as well as tools for harmonisation and edge-matching, and other tools for identifying areas of interest and products. It has also delivered some test services, that are available for view and evaluation by www.locationframework.eu .The ELF project is a good example of the public, private and academic sectors working together towards a single aim that will benefit governments, businesses and, ultimately citizens across Europe. It has developed a collaborative environment, fostered by EuroGeographics, and built on the strong technical competence of NMCAs and their partners. The ELF Project is complex technically, legally and organisationally, but its achievements are a strength that can be built on going forward. Following on the ELF project achievements EuroGeographics launched the two years' transition programme (from 2016 to 2018) from the ELF Project into operational European Location Services contributing to the vision of "to provide the single access point for international users of harmonised, pan-European, authoritative geospatial information and services". More information about the ELF project and European Location Services – www.eurogeographics.org

GeoLocator, as one of products of European Location Services, will be further maintained during the European Location Services transition adding more national data, improving the performance and adjusting the service to users demands.

GeoLocator service

The GeoLocator service is a georeferencing service that serves multilingual European geographical names data that has been collected from European National Mapping and Cadastral Authorities (NMCAs). In addition to the Geographical names (GN) data, the GeoLocator service also provides users with Address (AD) and Administrative Units (AU). The main use cases for the ELF GeoLocator service are:

- Use case A: a place name, address and administrative unit search functionality that can support for instance a web map application. The web map user interface may contain a name search form where users can type place names, addresses or administrative unit names. The queries are transferred to the ELF GeoLocator service that returns the coordinate location for the queried name. When the web map application receives the answer, it pans the map to the received location.
- Use case B: a web map application where user clicks a selected location on a map. The coordinates of the clicked location are transferred to the ELF GeoLocator service that returns the place name or address that is nearest to the clicked location. The administrative unit that contains the clicked point is returned if the administrative unit search mode is set on. The administrative unit hierarchy can be obtained by following the parent links that are included in the returned feature.
- Use case C: the place name content of the ELF GeoLocator is visualized on top of other content.

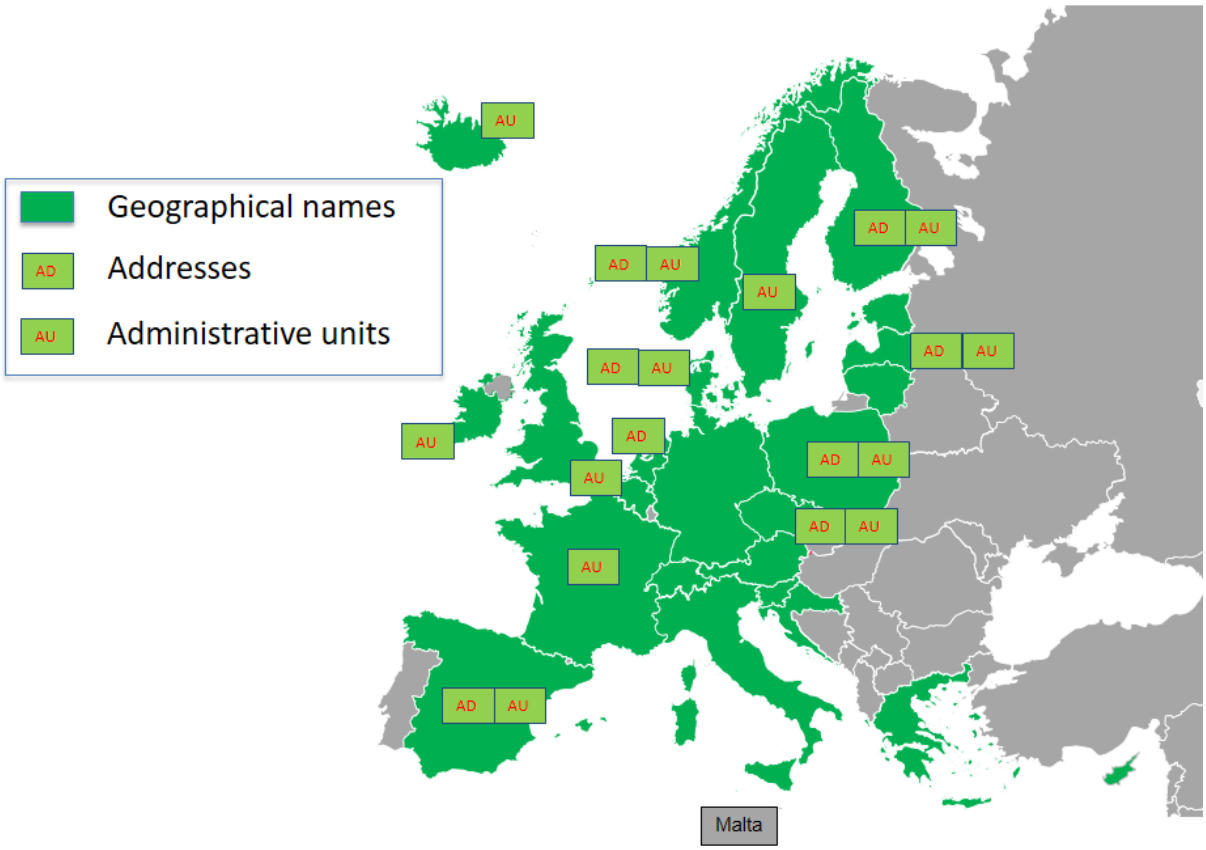

Fig. 1. The available data coverage of GeoLocator.

The GeoLocator service provides functionalities for performing geocoding (use case A) and reverse geocoding (use case B). Geocoding refers to the process of finding the coordinates of a feature on the basis of a given feature name or address. The reverse geocoding refers to the process of finding the place name that is located nearest to the given coordinate point. The geocoding functionalities of the ELF GeoLocator Service include ordinary geocoding, administrative unit -limited geocoding and fuzzy name search-based geocoding. The reverse

geocoding contains two functionalities, ordinary reverse geocoding and administrative unit-limited reverse geocoding [3].

The ordinary geocoding functionality is provided for geographical names-, addresses- and administrative unit-based data. The administrative unit–based geocoding functionality focuses the name search queries to a specific administrative unit names. The fuzzy name search-based geocoding functionality returns results that are near matches for the queried name. The reverse geocoding functionality can be used for finding the nearest place name or address for a selected coordinate point. For AU-based data, the GeoLocator service provides AU-based reverse geocoding where the clients can find the administrative unit, including the whole administrative unit hierarchy, in which the coordinate point is located.

The main output format of the GeoLocator service is the GML output that is compliant with the schema defined in the Open Geospatial Consortium's (OGC) Gazetteer Service Application Profile of the Web Feature Service (WFS-G AP) Best Practice document. The output of the GeoLocator service is provided mainly as SI_LocationInstance features, defined in the Gazetteer Service AP. Other supported GML-based output forms are the INSPIRE/ELF GN output and the Core Location Vocabulary (CLV) output. In addition are JavaScript Object Notation (JSON) and Keyhole Markup Language (KML) are supported as formats. The place name contents of the GeoLocator Service are also provided in visual form as a Web Map Tile Service (WMTS) [3]. GeoLocator provided Data-as-a-Service (DaaS). It is currently embedded in the ELF showcase application, but could be made available as a standalone component for other applications.

Currently GeoLocator provides geographical names (GN) information of 24 European countries (Figure 1). The connectivity of address (AD) and administrative units (AU) information is ongoing. The objective is to offer whole pan-European coverage in GeoLocator for European users. Due to successful engagement and collaboration amongst EuroGeographics members in the European Location Services initiative the number of data providers continues to grow.

The GeoLocator service is publicly available for test and evaluation in the ELF showcase application http://demo.locationframework.eu

Work on Exonyms and variant names

In addition to spatial information GeoLocator was further improved revising and populating exonyms and variant names linked with geographical. The focus of the work was brought to determine documents for official languages of countries with names data already integrated in the ELF names database. Another focal point was to get updated versions of already existing documents.

The Exonyms' Data Management comprises the following activities:

1. entering new exonyms and other variant names in the ELF names database and connecting these exonyms with their appropriate SpatialObjectID if available;

   The above-mentioned activity has been executed for Danish, Norwegian (Bokmål, Nynorsk) Polish, and Swedish and some more languages partly, according to the latest available lists of exonyms of the respective language [4].

2. Connecting already existing exonyms of the database with their appropriate endonymic datasets if available;

   The above mentioned activity has been executed for the joined countries Norway, Poland, and for some features in other countries [4].

3. Linking the endonyms of border crossing feature for the three countries Poland / Germany / Czech Republic.

4. Recognizing inaccurate / incomplete datasets and prepare them for correction. The noticed inconsistencies have been documented and the documentation shared with NMCAs encouraging to the improve the data quality aspects.

The above-mentioned activities have been executed for Danish, Norwegian (Bokmål, Nynorsk) Czech, Dutch, Finish, French, and German "completely" and for Spanish, Estonian, Galician and some more languages partly, according to the latest reliable lists of exonyms of the respective language.

For overall work on population and improving the quality of GeoLocator data during 2015 and 2016 resulted to the following [4]:

- more than 1 500 new names (exonyms and variant names),
- about 150 corrections of spellings, links to geographical features, SpatialObjectIDs, and other discrepancies in existing datasets.

All datasets supplemented or modified have been converted into two *.csv-files for being imported, deleted and corrected in the GeoLocator names database.

GeoLocator's potential serving European Union Gazetteer demands

European Commission executed the feasibility study for further EU action on establishing an EU-wide Gazetteer common service [5]. The study evaluates possibilities for establishing of an EU Gazetteer common service supporting the location-enablement of public services. It addresses the following research questions:

- Scope: What form should an EU Gazetteer common service take?
- Supply side analysis: What is already existing and is there a need for additional EU action?
- Demand side analysis: What are the specific needs that an EU Gazetteer common service could address?
- Business case: What are the investment options? What are the associated benefits, costs, and risks?

The study has not yet been completed. All possible data sources (Public sector, private sector, crowd-source data providers) are considered to be used filling the data content for EU Gazetteer. The initial consideration toward GeoLocator perspective serving as a source for EU Gazetter are promising. It was admitted that GeoLocator could be a suitable starting option for an EU Gazetteer common service, but further developments both in extending coverage to full EU, and adjusting the service to EU gazetteer requirements (to be specified) are needed.

References

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