The European Location Framework enabling the interoperability of geo-spatial PSI

Reference: EuroGeographics positioning Paper for W3C & ETSI workshop, "Removing the roadblocks to a pan European market for Public Sector Information re-use"

1 Executive Summary

An important barrier to the re-use of PSI is the lack of a consistent geographic reference framework that can be maintained at the national level and used in a cross border or pan-European context.
The solutions are to adhere to standards for the creation of reference data from Member States, it's coordinated production into a pan-European offering and to implement best practice for interoperability services that use the resultant data.

Our contribution toward implementing the solutions are the publication of best practices for interoperating data and services, the free software and tools needed to harmonise the data sets and the support of an existing and growing E.L.F .(European Location Framework) community. Live reference data services are now available and a commitment to deploying these data and service specifications in existing products and services by EuroGeographics will help ensure this vital standardisation takes place.

The INSPIRE legislation is a vital part of creating harmonised data sets. We have proposed extensions that are INSPIRE compliant to the INSPIRE specifications making them more effective in achieving interoperability between national data sets. It is clear that an engaged community of stakeholders throughout the supply chain of location information is needed to encourage adoption of these important extensions and to exploit their outcomes. It is also necessary to have an active coordination of those organisations providing future E.L.F./INSPIRE reference data and services.

The E.L.F could be considered as an important component for the European Interoperability Framework in the Digital Agenda. As our paper indicates the eContentplus programme has been very successful in furthering the development through supporting projects like ESDIN. A large scale implementation of E.L.F is needed and support from CIP ICT PSP would be essential in this process.

2 Introduction

Complexity characterises the production of reliable European location data. Because usage of, demand for, and access to data is different in every country, each nation adopts its own solutions to meet its own unique internal needs. So it is no surprise that complexity grows when you draw together these data sets to make a cohesive "whole" data source for Europe. This situation can be envisaged for nearly all nationally derived sets of public sector information (PSI).

The ESDIN project, part funded under the eContentplus scheme of the EC, had an ambitious remit to provide the best practices in creating harmonised data for pan-European use and help countries meet their INSPIRE obligations. By recognising that these interoperability issues must be accepted as a collective responsibility for the Location information supply chain, ESDIN went beyond this remit in order to lay the foundations of what we now know as a European Location Framework (or E.L.F.) of data and services.

In addressing these challenges to interoperability, ESDIN set out to;

- Bridge the gap between users and providers of official location data

- Help member states improve access to their data
- Help member states prepare, harmonise and maintain pan-European data for INSPIRE themes
- To target and meet the increasing demands of users
- Improve efficiency in all the processes involved
- And unite experts from across geospatial oriented communities through various discussion fora to stimulate the development, use and re-use of European digital content in global network.

In uniting experts we created a powerful best practice network connecting end users, vendors of spatial data solutions, developers, national mapping and cadastral agencies.
250 reference group members have been connected by ESDIN events and a dedicated forum site. A subset of these became our key users. Insights about these groups gave focus to our work. The broad insights into these groups' needs show us that;

- Consistent reference data & identifiers will give their analysis some context,
- Clear updates and other meta information, such as the data origin will aid integration with user data sets,
- Trust worthy, quality assured data will eliminate the need to verify the data at the user end,
- Data from quality led processes ease the integration process with their own data sets,
- They will value an "open" policy for data

3 The barriers to interoperability of geo-spatial PSI

Increasingly location data is in demand to provide context to data and services for professional and leisure purposes. During the ESDIN project the following barriers were experienced and led to a number of solutions and proposals in the later sections of this paper.

3.1 No consistent common reference data in all level of details at Pan-European level

At EuroGeographics we already make pan-European data (EuroRegionalMap & EuroGlobalMap for example) from the official national sources. The task is highly manual and derived from numerous sources at each National Mapping and Cadastral agency (NMCA). Deriving and generalising from a master data set in each country would hugely assist in automation, efficiency and consistency. Users like Eurostat and EEA demand reliable data for decision making and statistical analysis at regional level and in hotspots also at master data level.

3.2 No uniting specifications on national data in a pan-European context

Each Member States needs to meet INSPIRE obligations. However there is a need to do 'extra' work to combine data for the cross-border and Pan-European use. There is a need to build these specification based on existing best practices. .

3.3 Still developing tools

During ESDIN we created a number of pilot interoperability services. Further development of these tools are required related to edge-matching, quality assurance, maintaining unique identifiers, secure access to data, finding data and managing licenses.

3.4 Lack of understanding of how the data will be used

Typically a nationally derived data set has been created to the specification of that nations need. No pan-European organisation would have been consulted in deriving this specification.

3.5 Lack of national specification transformations to a European specification

Typically a national data specification will need to be transformed to the target European specification for the purpose of harmonisation. The tools to make this happen have not been created.

3.6 Technology or policy lag at agencies prevents use of open architectures.

Open Architectures are in favour, but the national agencies are at varying levels of adoption. Most often this is due to a technical learning curve, but in some cases a policy decision not to use Web Feature Services for example.

3.7 No common reference framework

As a consequence of the above there is not a common set of reference data that is readily maintained at a national level for use at a European Level. Until there is member states will continue to opt for solutions that are incompatible with each other.

4 Some solutions: What the European Location Framework Proposes

Our partnership of data providers, developers, academics and software vendors worked with expertise in Open Source and SDI development.

For consistency we propose one reference data layer is used at the regional level of detail and that smaller scale offerings are derived from this data. Larger scale reference data becomes available via the NMCA's distributed services.

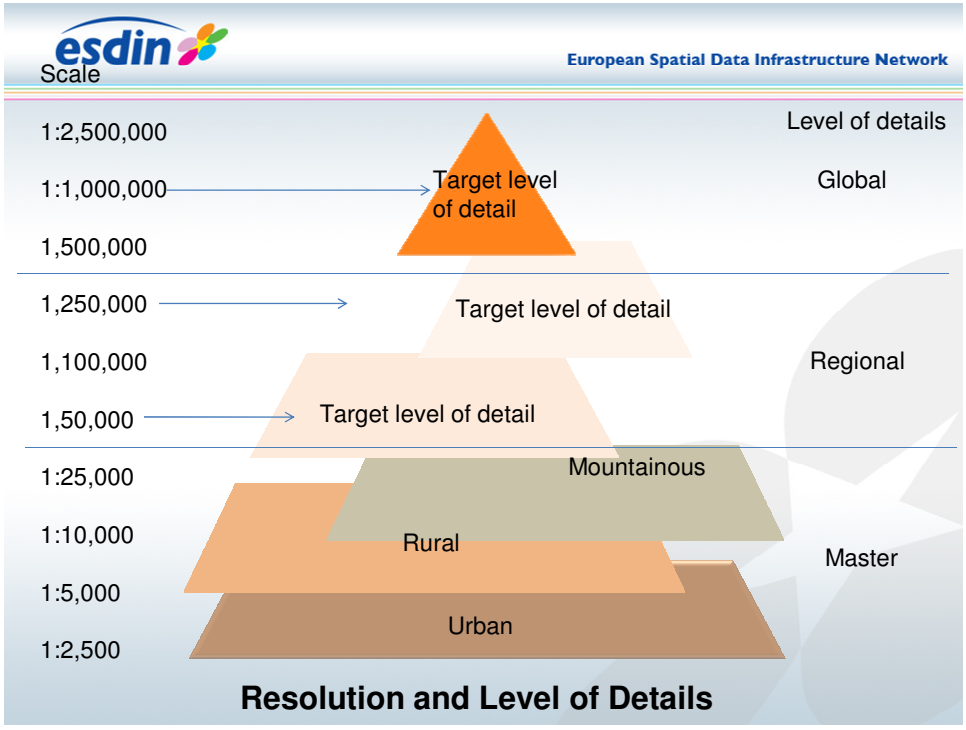

Figure 1: Resolution levels in a European Location Framework

Tools are needed for the NMCA's to consistently edge-match, quality assess, generalise, transform and provide secure access to their data. In order to be relied upon the reference data needs to include consistent unique identifiers and indications of quality.

Aligning currently used thematic data sets such as ECRINS (hydrology reference used by the European Environment Agency) with this reference data will assure take-up. Making sure the data policy and licensing work from all perspectives will be an important part of this work.

In concept the European Location Framework is:-

•A set of specifications for reference data and interoperability services.
•Interoperability across resolutions, themes and between countries for topographic, administrative and cadastral reference data.
•Reference data services implemented by the Member States (NMCAs).
•Interoperability services by actors.
•Co-ordination by European organizations (e.g. EuroGeographics).
•Funded by Member States, Commission and users.
•A community of users and other data providers, developers and service integrators.
•Work together with other players to create the infrastructure

5 Our current contribution to E.L.F.

ESDIN has been successful in creating a network of users, creators, developers and stakeholders of the E.L.F. The nodes in this network are the consortium itself (20 partners). The network continues to grow thanks to the work so far and the commitment of partners to keep the developments alive and supported in the short term with plans for a longer term more open access to data and services from the National Mapping and Cadastral Agencies.

We have provided and made available our recommendations for best practice in achieving INSPIRE compliance, implementing a technical architecture for pan-European geospatial data harmonisation, quality led processes and tools for harmonisation and a flexible access solution for data and services.

To demonstrate this best practice in action we have already produced prototypes for quality evaluation, edge-matching, generalisation tools and access control. We have implemented interoperability services based upon national data holdings across 5 INSPIRE Annex 1 themes. We have also provided best practice in specifications, metadata, quality evaluation, generalisation, edge-matching, transformation, access control, license and data management,

As a result of this work National Mapping and Cadastral agencies are now equipped with the tools to make consistent contributions to the E.L.F. Stakeholders can access live services from the NMCAs with the assurance that these will be kept live until the end of August 2011. All software deliverables are available for use under the permissive Open Source BSD license.

6 Our future plans – how we plan to encourage implementation of E.L.F.

EuroGeographics has set up an internal project amongst its members and the ESDIN participants. A Task Force is being appointed to oversee the activities that will lead to adoption of the above specifications in NMCAs and so help the exploitation of resultant services.

- A discussion paper on the NMCAs/EuroGeographics role for panEuropean/cross-border SDI in INSPIRE has been created to garner opinion on how best to coordinate the E.L.F.
- There will be a Launch of the INSPIRE/E.L.F. demonstration service under EuroGeoForum site at the 2011 INSPIRE conference
- Launch of EuroGeographics Web Map Service under the EuroGeoInfo site will demonstrate EuroGlobalMap (EGM), EuroRegionalMap (ERM), EuroBoundaryMap (EBM) and EuroGeoNames(EGN)
- Applications to the current and future ICT-PSP funding calls in order to implement E.L.F. components in active consortia and extend the ELF community.
- Presentations on ESDIN results and E.L.F. at conferences and internal communication between members (GA, regional meetings)

We are already starting the implementation of ESDIN results at EuroGeographics by

- The generalization process developed will produce EGM from ERM, ERM admin from EBM and EGM admin from EBM
- ERM will be based on E.L.F.specs in 2013
- EuroGeoNames will be implemented based on new architecture before launch in 2012

7 Recommendations

In order to service the increasing demand for location context to PSI we need to ensure a consistent set of reference location information. It is our view that this is best achieved by deriving reference data from the national sources. The specifications needed will go beyond those currently mandated in INSPIRE legislation, so there is a need to build awareness and convince mandated organisations of the need to adopt these extra specifications.

To help this happen we believe that the guidance on the public procurement should include these standards to support interoperation between PSI services. One possible way to achieve this is by proposing E.L.F. specifications as European Standards, which we currently consider. It is clear that cross-border and pan-European harmonization has to be taken into serious consideration under future CIP ICT PSP funding calls and further to discuss how E.L.F can be part of the European Interoperability Framework as part of the Digital Agenda.

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