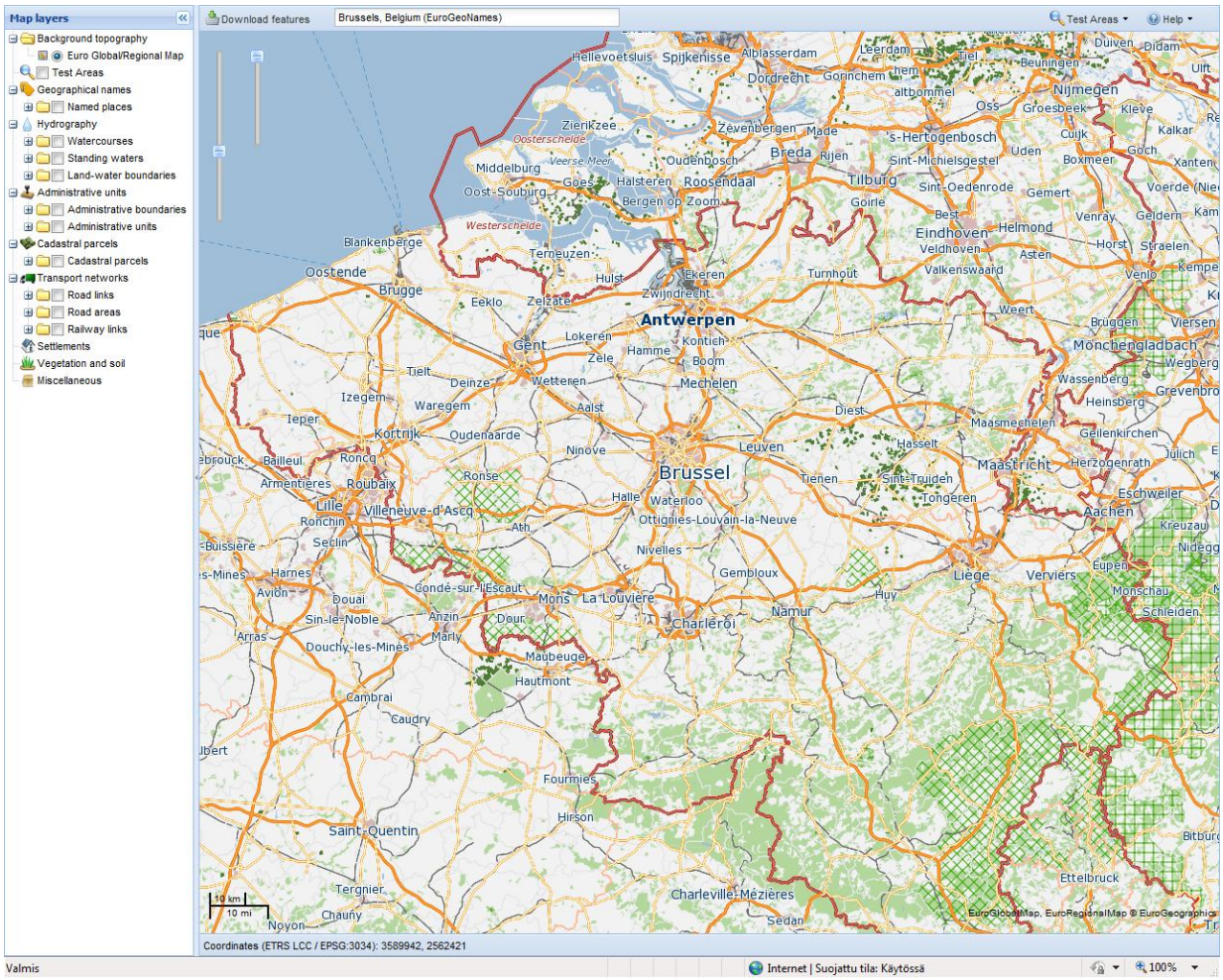
European Location Framework

White Paper v1.0

29th February 2012 Antti Jakobsson



Front cover: E.L.F/INSPIRE demonstrator as developed by ESDIN project

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1 Executive Summary

This paper is introducing the European Location Framework (E.L.F). It builds on the European Interoperability Framework (EIF) as described in a programme on interoperability solutions for European public administrations (ISA) and the INSPIRE directive. The E.L.F concept was developed in ESDIN project (2008-2011) co-funded by the European Commission's EContentPlus-programme.

The interoperability of geoinformation has same characteristics as data interoperability in general. The EIF describes four interoperability levels; legal interoperability, organisational interoperability, semantic interoperability and technical interoperability. The European Location Framework (E.L.F) covers some aspects of organizational, semantic and technical interoperability.

The European Location Framework is a technical infrastructure which delivers authoritative, interoperable, cross-border geospatial reference data for analysing and understanding information connected to places and features.

The European Location Framework builds a geospatial reference data infrastructure and provides interoperable reference data and services from national information assets enabling users to build their work on it. Once developed and adopted they will be the basis for the official framework providing location information needed to geographically reference objects from other domains allowing pan-European interoperability.

The ESDIN final report[1] gives a summary of results on the development of the E.L.F and illustrates number of case studies. The work was based on comprehensive analysis of European user requirements. As a result of the ESDIN number of prototype interoperability services was developed. These are now developed further by EuroGeographics Reference Data Production Programme.

This paper does not describe implementation of the E.L.F which is dependent on interoperability agreements between different stakeholders and available funding. The European Location Strategy would be needed to set up the political context and how the E.L.F could be implemented by the Member States and the European Commission.

EuroGeographics is already working on many aspects of interoperability when it is providing European geospatial reference datasets. Annex I describes EuroGeographics current activities. This paper is targeted to its members for consideration when they are working on National Spatial Data Infrastructure implementation where the European Interoperability Framework should be considered. EuroGeographics has set up a task force that is planning the implementation plans of the E.L.F. These plans will then be feed to the medium term plan of the Association.

2 Introduction

The Digital Agenda for Europe is one of the seven flagship initiatives of the Europe 2020 Strategy, set out to define the key enabling role that the use of Information and Communication Technologies (ICT) will have to play if Europe wants to succeed in its ambitions for 2020[2]. A programme on interoperability solutions for European public administrations (ISA), including local and regional administrations and Community institutions and bodies, have been set up for the period 2010-2015[3]. This programme is providing common and shared solutions facilitating interoperability. Under this programme a project on EU Location Framework will start in 2012 and develop specifications needed to establish interoperability in geospatial domain among public administrations. The INSPIRE directive establishes the basis for sharing and delivering geospatial data for environmental purposes. The Public Sector Information Directive (PSI directive) provides the principles of reuse of public sector information. All these build the political and legislative context for creating geospatial interoperability based on public administration data sources. This paper will define what is the European Location Framework and how it will help establishing the interoperability in geospatial reference data. It is based on experiences gained in ESDIN project and long term work on compiling European reference data in EuroGeographics based on national datasets.

[1] http://www.esdin.eu/sites/esdin.eu/files/ESDIN_brochure_paginated_0.pdf

[2] Communication from the Commission COM/2010/0245 f/2 A Digital Agenda for Europe

[3] DECISION No 922/2009/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 September 2009 on interoperability solutions for European public administrations (ISA)

3 Background

The purpose of the European Interoperability Framework (EIF) is:

- to promote and support the delivery of European public services by fostering cross-border and cross-sectoral interoperability;
- to guide public administrations in their work to provide European public services to businesses and citizens;
- to complement and tie together the various National Interoperability Frameworks (NIFs) at European level.

In the European Interoperability Framework (EIF) following definitions are given

European public service means *'a cross-border public sector service supplied by public administrations, either to one another or to European businesses and citizens'.*

Interoperability is defined as following;
Interoperability, within the context of European public service delivery, is the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems.'

Interoperability framework
'An interoperability framework is an agreed approach to interoperability for organisations that wish to work together towards the joint delivery of public services. Within its scope of applicability, it specifies a set of common elements such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices.'

The EIF introduces four levels of interoperability (Figure 1). In the ESDIN project semantic and technical levels of interoperability were analysed[4] and appropriate suggestion were made. In order to facilitate the cooperation among public administrations for provision of a European public service, the EIF introduces approach to make **interoperability agreements** at the different interoperability levels.

At legal level these agreements are rendered specific and binding via legislation, including European directives and their transposition into national legislation, or bilateral and multilateral agreements, which are outside the scope of the EIF.

At organisational level, interoperability agreements can, for example, take a form of **MoUs** or **SLAs** that specify the obligations of each party participating in cross-border business processes. At semantic level, interoperability agreements can take the form of reference taxonomies, schemes, code lists, data dictionaries, sector based libraries and so forth. At technical level, interoperability agreements include interface specifications, communication protocols, messaging specifications, data formats, security specifications or dynamic registration and service discovery specifications.

[4] See ESDIN D5_2 EuroGeographics Technical Architecture www.esdin.eu

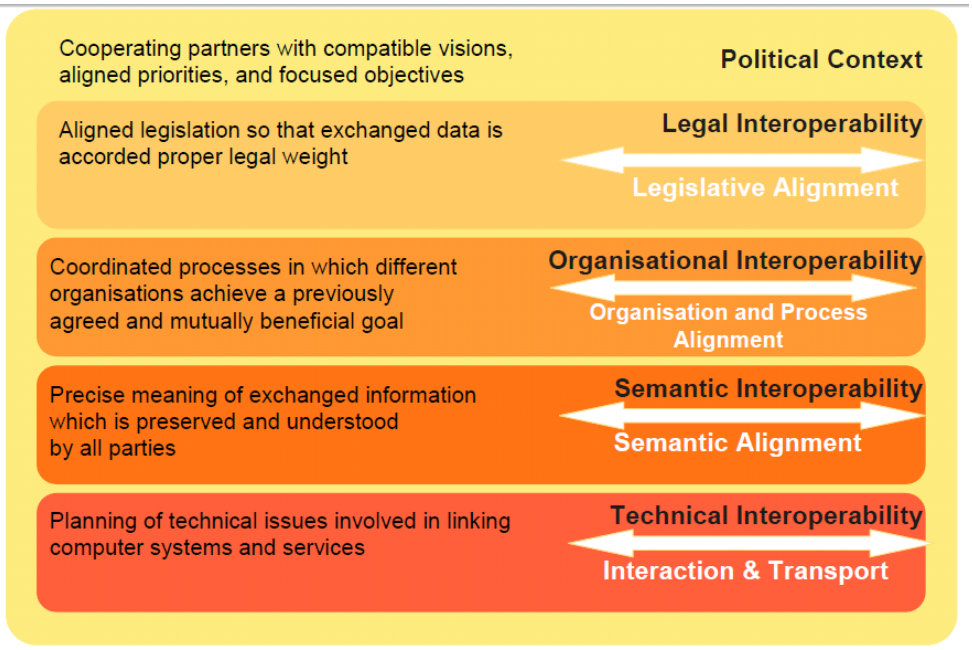

Figure 1 Interoperability levels in the EIF

The EIF also gives recommendations how the interoperability framework should be established. We reference those recommendations in the European Location Framework where appropriate.

In all geospatial infrastructure activities the concept of reference data is important. ***Reference datasets*** are series of datasets that everyone involved with geographic information uses to reference his/her own data to as part of their work. They provide a common link between applications and thereby provide a mechanism for sharing knowledge and information amongst people[5].

Key characteristics of reference data include:

- It provides an unambiguous location for a user's information;
- It enables the merging (aggregating/fusing) of data from various sources;
- It provides a geographic framework or context to allow others to better understand the spatial information that is being presented;
- It is subject to a regular data maintenance regime;
- It is provided from a authoritative source with a mandate, or responsibility, for its maintenance and availability.

Figure 2 explains the connection of reference data to other datasets, service integration and user applications. It is important to realize that the reference data and services nearly never meet user requirements totally. There is always other elements that are needed like additional data, merging data together, and creating end-user services (service integration) and end-user applications.

[5] FGDC, 2005; Rase et al., 2002

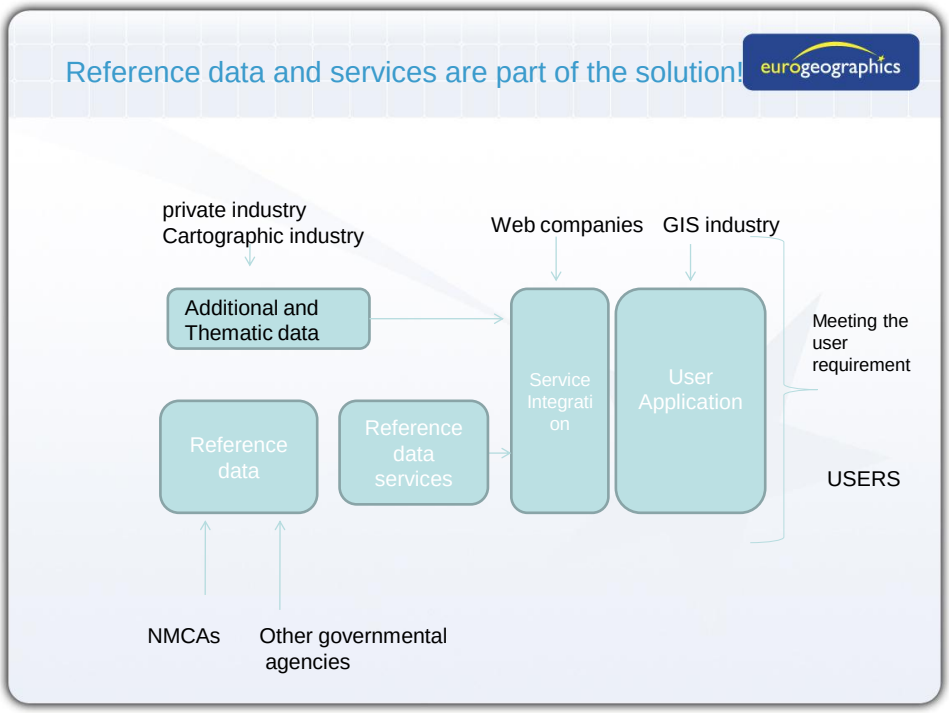

Figure 2 Reference data and services meet partly the user requirements

The NMCAs have a key role in implementation of eGovernment initiatives in their countries. This role should be utilized in the European context as well. EuroGeographics can be play a key link by utilizing the Commission programmes related to eGovernment including ICT PSP, eParticipation preparatory action and eTEN (Trans-European e-services).

The main argument often used when looked the utilization of reference data from the Member States is that is not available and that is the reason why it should be done again e.g. by using satellite remote-sensing.

EuroGeographics has investigated the status of reference data in its member organizations. A very comprehensive study was made in 2004 and a smaller study in 2009. The 2009 study covered 34 countries and 37 member organizations.

Figure 3 present the availability of national datasets containing topographic data in scale levels 1:1000 - 1:25 000. The conclusion from this is that in most of the countries this very high accurate data is available. Therefore it is possible to set up an infrastructure based on reference data utilizing these sources. In the E.L.F the plans how we would categorize these data to urban, rural and mountainous areas is explained. There is no need for setting an uniform scale level at the national data level because user requirements at national level have not indicated a need to cover for example rural areas with 1: 1000 level data.

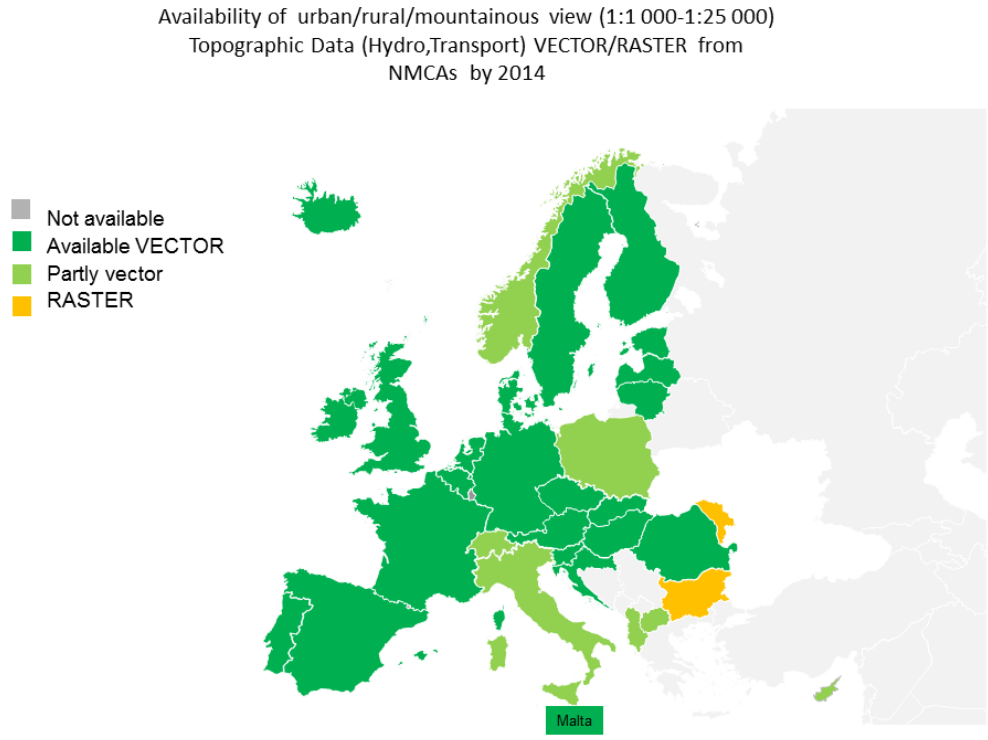

Figure 3 Availability of national data sets in Europe

As a fast track solution of providing the coverage for the whole Europe, a raster based solution would be very economical way to do it. Figure 4 presents the coverage of the raster data available from the countries.

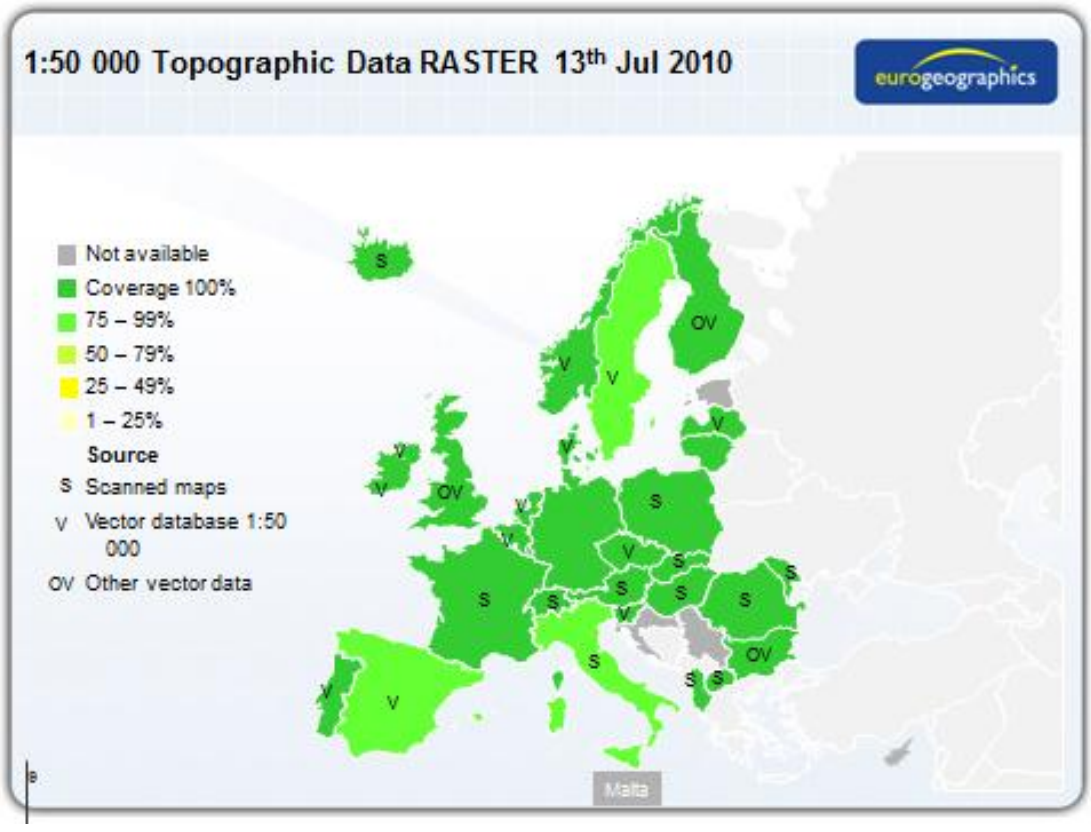

Figure 4 1:50 000 coverage RASTER

Only few European Union countries do not have raster coverage at 1:50 000 level. For example Estonia has a vector coverage of the 1:50 000, but raster provision would be a rather simple task. The figure also indicates that majority of the countries indicated that the source of this raster coverage is a vector dataset, which would indicate that a raster version would be fairly up-to-date.

Figure 5 presents the current up-to-date frequencies of topographic data. It shows that about 50% of the countries in scale 1:50 000 is less- than 2-4 years, and in 95% of countries less than 5-10 years.

Another argument of not using reference data is the price of data. Our studies show that there are still rather big variances between the countries. The situation is changing very rapidly at the moment and price levels are going down each year.

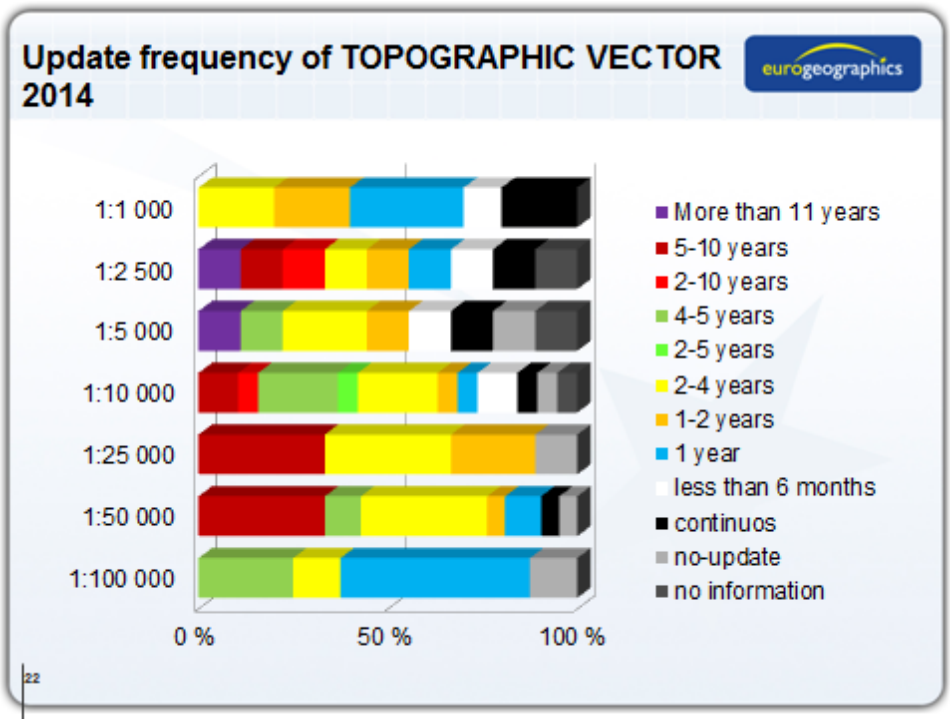

Figure 5 Updating frequencies of topographic data

Figure 6 represents the price levels of topographic data in European NMCAs. In some countries there is no price for the data (Romania, Slovenia and Spain with some restrictions). Because of the high variations the median price gives probably the right impression of the price level in general. If we take the area of the European Union (4.3 mill.km^2) the median license price of 1:100 000 would be 0.5 million euro, 1:50 000 about the same, 1:25 000 0.8 million, 1:10 000 4.3 million. These would not of course be the real prices but gives an idea about the level at the moment.

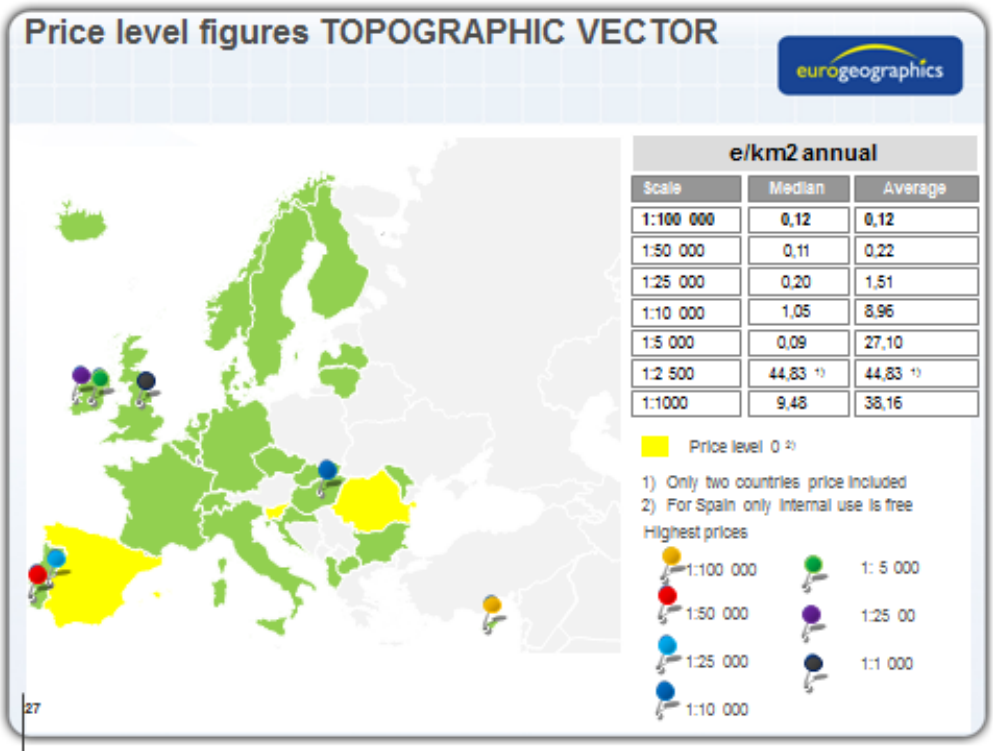

Figure 6 Price levels of topographic vector data

Figure 7 represents raster prices. Variation of prices is smaller here and price level is considerable lower. Again the whole European Union coverage using the median price would be in 1:100 000 43,000 euro, 1:50 000 86,000 euro, 1:25 000 0.3 million euro and 1:10 000 0.5 million euro.

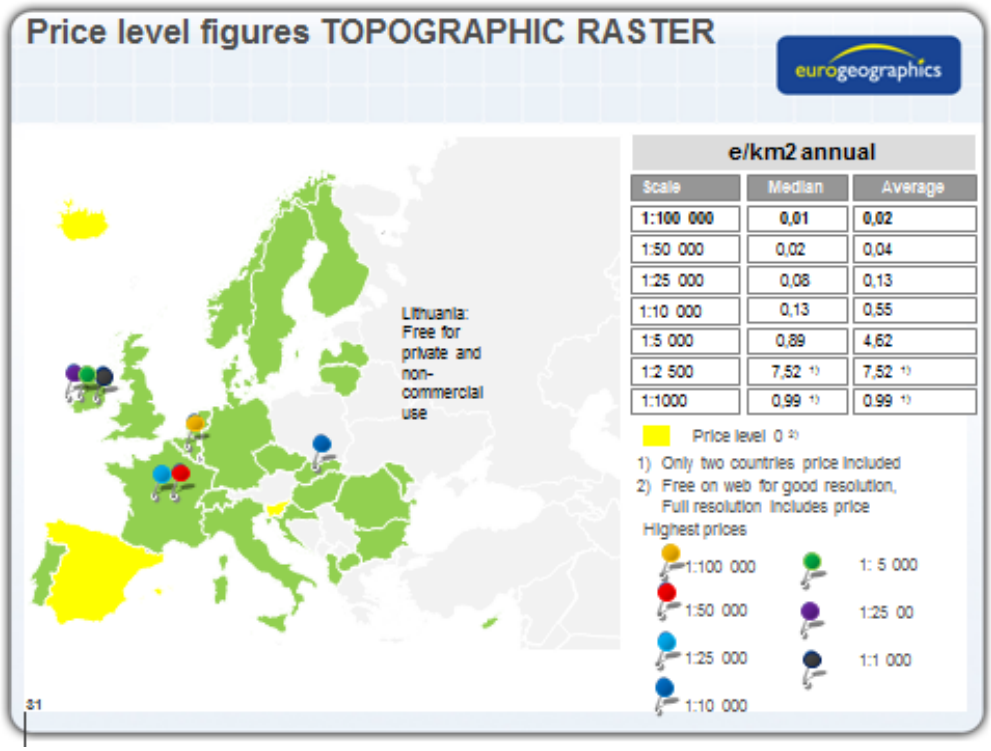

Figure 7 Raster prices of topographic information

In our analysis of what is needed for making INSPIRE data useful for the European context, EuroGeographics and ESDIN project has concluded that some additional work has to done in order to meet the user requirements

This means mostly work on;

1. **Setting the specifications** based on INSPIRE so that they contain quality and inclusion criteria for the features and setting the unique identifiers (UIDs)

2. **Setting the processes between the actors** that provide the data sets; these processes have to define
    - transformation (co-ordinate/model)
    - edge-matching (cross-border consistency)
    - quality evaluation and conformance testing
    - quality management (utilizing accreditation)
    - generalization

3. **Provisions of reference data services to user services through service integration and applications**
    - incremental updating
    - authentication, authorization and accounting (AAA) management
    - data policy/licensing
    - business processes
    - service architecture

and of course there has to be a continuous dialog with various actors in place.

An example of data integration process problems we have inside EuroGeographics in the EuroRegionalMap process. Even the data specification is uniform it is difficult to achieve uniform selection of features when the generalization levels in national specification varies. Figure 8 represents the hydrography layer of current version of the ERM where countries' borders are sometimes evident. Figure 9 represents the road layers in 2009 version. In road data the main problems has been that there is no uniform road classification agreed in Europe.

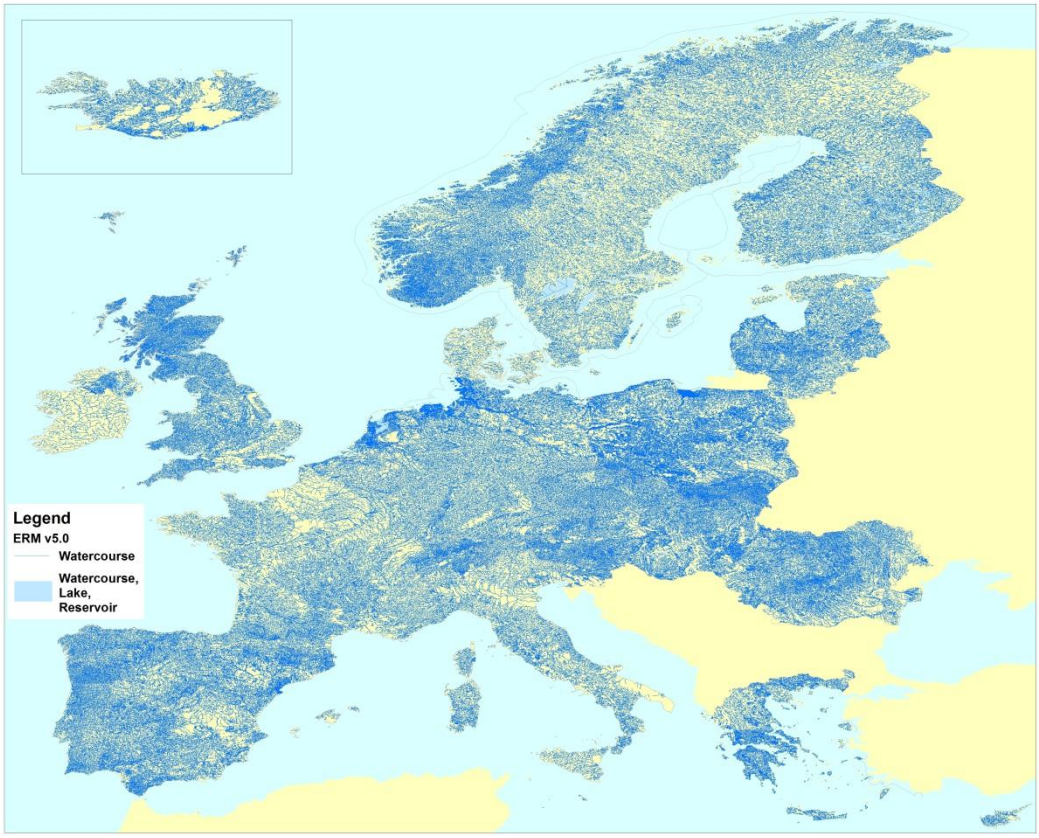

Figure 8 ERM Hydrography layer version 2012

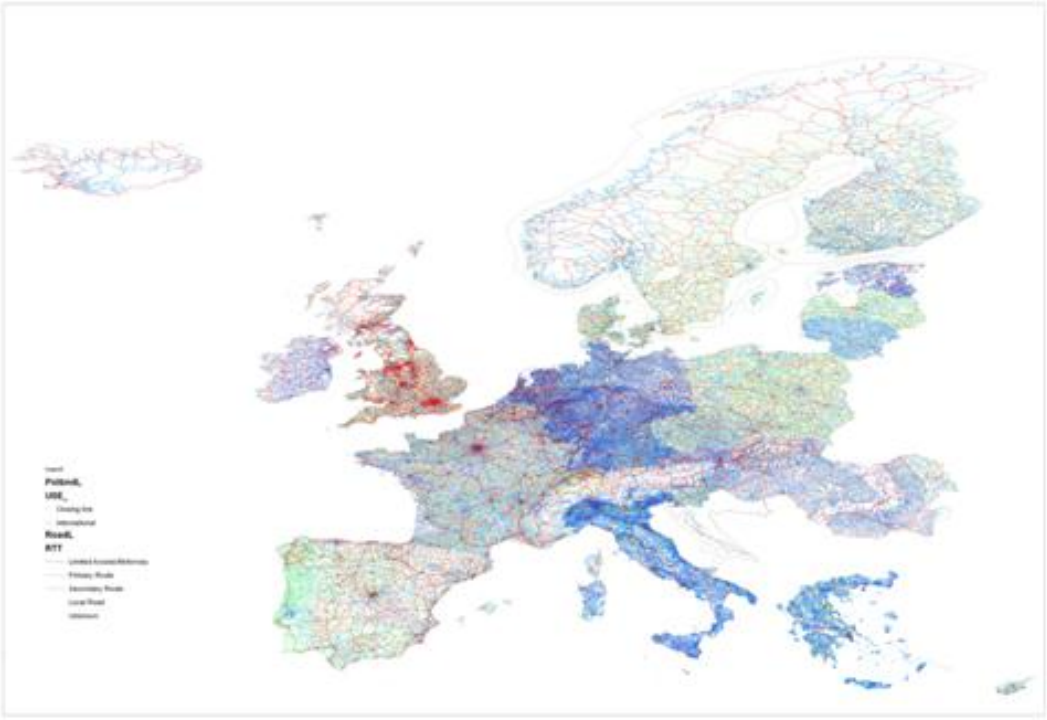

Figure 9 ERM road data version 2009

4 The European Location Framework

EuroGeographics has set the European Location Framework for its long term target. The following is describing the current vision on it. It is based on findings from the ESDIN project and long term work on providing European datasets based on national contribution.

4.1 Background

We adopt the main principles of EIF interoperability framework, which is

- *An agreed approach to interoperability for organisations that wish to work together towards the joint delivery of public services.*
- *Within its scope of applicability, it specifies a set of common elements such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices.'*

We also take EIF recommendations 1 and 25 into account when planning the implementation of the European Location Framework[6] [7]. Other recommendation are referenced where appropriate.

The European Location Framework (E.L.F) **builds a geospatial reference infrastructure and provides interoperable reference data and services from national information assets enabling users to build their work on it**[8]. Once developed and adopted they will be the basis for the official framework providing location information needed to geographically reference objects from other domains allowing pan-European interoperability.

4.2 The concept

The European Location Framework (E.L.F) is based on set of specifications for ***geospatial reference data*** which provides information about places and features on the Earth's surface to allow other information about that place or feature to be connected to it. The E.L.F specifications supports ***interoperability across resolutions, themes and between countries for topographic, administrative and cadastral reference data***.

When adopted by data providers the E.L.F provides INSPIRE compliant data for Europe[9]. It creates a new approach for Pan-European geospatial reference data based on services from National Mapping and Cadastral Agencies through National Spatial Data Infrastructures.

User requirements are very important for the E.L.F. In order to meet these requirements **an E.L.F community**[10] will be launched. The starting point of this community will be the ESDIN consortium but it will be open for all stakeholders (e.g. data providers, data users, developers, standardization bodies)[11] .

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[6] **Recommendation 1. Public administrations should align their interoperability frameworks with the European Interoperability Framework to take into account the European dimension of public service delivery.**
[7] **Recommendation 25. Public administrations should establish a framework for the governance of their interoperability activities across administrative levels.**

[8] **Recommendation 19. Public administrations should agree on the formalised specifications to ensure technical interoperability when establishing European public services.**
[9] **Recommendation 14. Public administrations should carefully consider all relevant legislation relating to data exchange, including data protection legislation, when seeking to establish a European public service.**
[10] **Recommendation 18. Public administrations should support the establishment of sectorspecific and cross-sectoral communities that aim to facilitate semantic interoperability and should encourage the communities to share results on national and European platforms.**
[11] **Recommendation 2. Public administrations should ensure that public services are accessible to all citizens, including persons with disabilities and the elderly, according to e-accessibility specifications widely recognised at European or international level.**

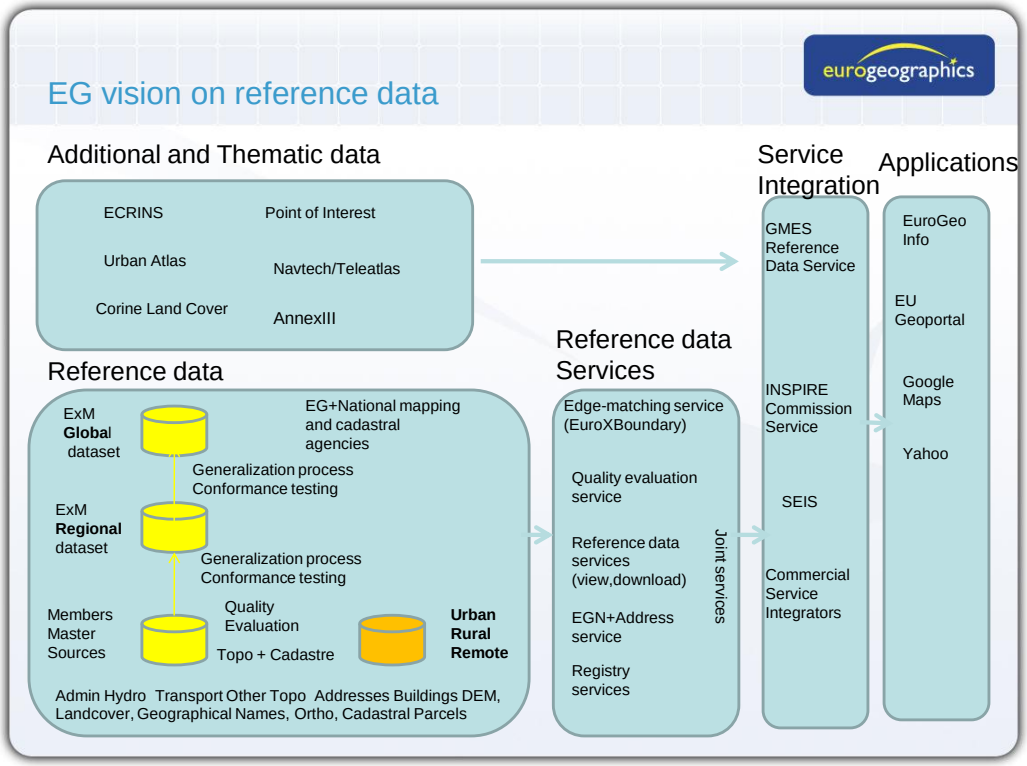

Figure 10 The EuroGeographics vision on geospatial reference data

4.3 The Coverage

The E.L.F targets to cover all of Europe based on adoption by the National Mapping, Land Registry and Cadastral Agencies. It can be utilized outside of Europe as well. The Figure 11 shows planned coverage of the ELF reference data based on the current availability of geospatial reference data at Europe regional and global level. The target coverage at national level is not yet agreed.

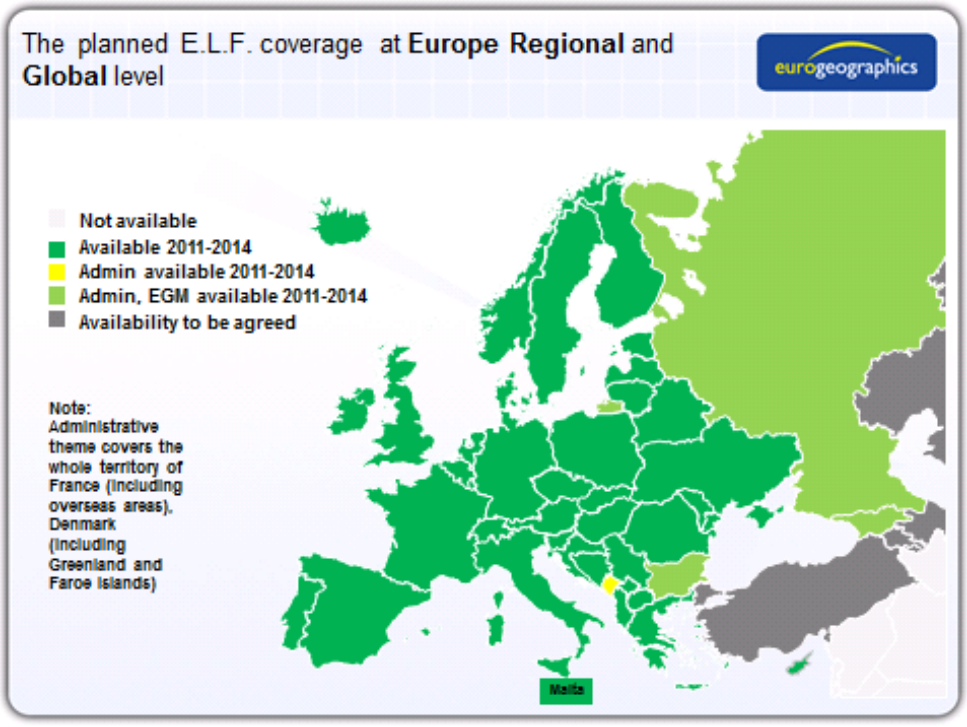

Figure 11 The planned coverage of E.L.F at Europe regional and Global level

4.4 Conformance with International Standards

The specifications are based on ISO/EN 19100 standards.[12] The services are implemented using web service standards developed by OGC and officially adopted by ISO/CEN. The data content and services are compliant with INSPIRE IRs and specifications. The E.L.F will also consider requirements from international communities like GEOSS[13], DGWIG (DFDD)[14] and GlobalMap[15] [16].The E.L.F specifications will be proposed as updates to INSPIRE or ISO/CEN processes taken into account the EIF developments (EU Location Strategy)[17] [18].

4.5 The Level of Details /Scale

The specifications will include selection criteria for making interoperable products across borders regardless of the resolution or scale of national data[19]. It supports a wide range of resolutions from national level 1:2,500-1:50,000 typically available for urban, rural and mountainous areas, Europe regional data level typically 1:50,000 -1:250,000 scale and global data level normally at 1:1,000,000 scale. Scale presents a traditional mapping views to these level of details.

Figure 12 illustrates target levels of details set for global, Europe regional and master data sets levels. At regional level we can see two target levels of details; one at 1:250,000 for European usage and second 1:50,000 for more detailed usage. These would be typically covering the whole country. At master data level countries typically have classified their target level of details for urban, rural and remote areas but there is not necessary an harmonized level of detail for the whole country. There is a transition zone between global, regional and master data set levels.

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[12] **Recommendation 6. Public administrations should aim for openness when working together to establish European public services, while taking into account their priorities and constraints.**

[13] http://www.earthobservations.org/

[14] Defence Geospatial Information Working Group Feature Data Dictionary http://www.dgiwg.org/dgiwg/htm/documents/standard_operating_procedures.htm

[15] EuroGlobalMap is providing European contiribution to GlobalMap intitiative http://www.iscgm.org/cgi-bin/fswiki/wiki.cgi

[16] **Recommendation 8. Public administrations should not impose any specific technological solution on citizens, businesses and other administrations when establishing European public services**

[17] **Recommendation 21. Public administrations should use a structured, transparent and objective approach to assessing and selecting formalised specifications**

[18] **Recommendation 23. Public administrations should lead or actively participate in standardisation work relevant to their needs**

[19] **Recommendation 11. Public administrations should make their authentic sources of information available to others while implementing access and control mechanisms to ensure security and privacy in accordance with the relevant legislation**

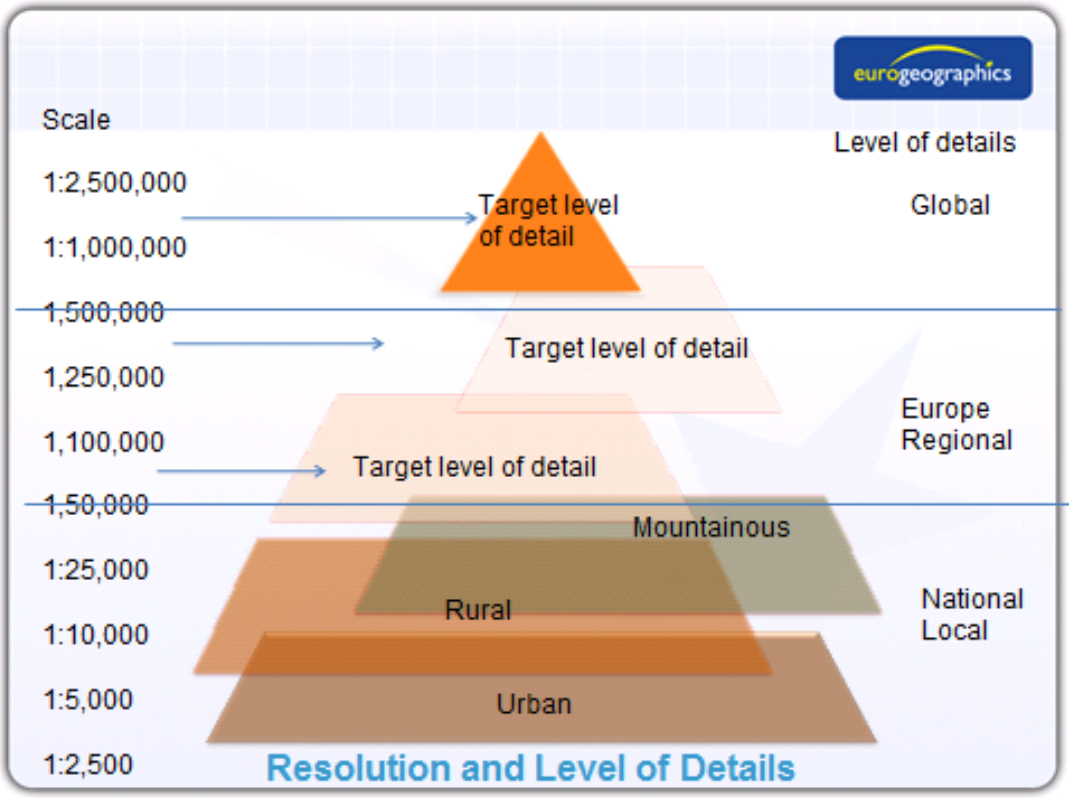

Figure 12 Level of details

4.6 Themes

The specifications are appropriate to the following (INSPIRE) data themes[20]:

- Administrative Units (AU)
- Hydrography (HY)
- Transport networks (TN)
- Geographical names (GN)
- Cadastral parcels (CP)
- Addresses (AD)[21]
- Elevation (EL)[8]
- Buildings (BD)[8]
- Land Cover (LC)/Land Use (LU)[8]
- Orthoimagery[8]
- And some additional features based on European user requirements (these may be part of INSPIRE Annexes II and III)

[20] **Recommendation 12. Public administrations, when working to establish European public services, should develop interfaces to authentic sources and align them at semantic and technical level.**

[21] Will not be included in the first phase of the specification based on ESDIN project

The data content inside themes will be depending on the availability of data at the national master data and regional levels[22]. Target content will be set using quality conformance levels.

4.7 Linking data with other datasets

The E.L.F reference data will be linked with other European datasets using identifiers[23]. These include INSPIRE unique identifiers, Official code of LAU[24] unit in administrative units, European statistical region codes (NUTS[25]), hydrographic identifiers, national and European road numbers, railway UIC[26] codes, ICAO[27] and IATA[28] codes for airports, port UN/Locodes[29], and settlement identifiers.

4.8 Quality and metadata

The specifications sets conformance levels for quality and requires suppliers to provide metadata for data discovery and quality evaluation purposes. Quality information and Metadata is INSPIRE and ISO/CEN compliant.

Target levels for completeness and positional accuracy will be set for feature types. Data provided by NMCAs will be classified to different quality levels.

An important ESDIN project finding is that quality evaluation has to be repeated for all process steps in SDIs. The ESDIN project showed that original evaluation results can be semi-automated by introducing web-based modules e.g. for sampling and conformance results and, after this, an automated evaluation may be introduced for other process steps like schema transformation, edge-matching and generalisation. This approach will provide cost savings to data providers and quality measures for usability evaluation. See more details in ESDIN Final Report.

4.9 Interoperability processes and specifications

Reference data needs number of supporting processes[30] in order to work properly. The E.L.F will include specifications for

- transformation (co-ordinate/model)
- edge-matching (cross-border consistency)
- quality evaluation and conformance testing
- generalization
- unique identifiers UIDs[31]
- incremental updating
- security and privacy[32]
- data policy/licensing
- business processes[3334]

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[22] **Recommendation 24. Public administrations should ensure that interoperability is ensured over time when operating and delivering a European public service**

[23] **Recommendation 20. Public administrations, when establishing European public services, should base interoperability agreements on existing formalised specifications, or, if they do not exist, cooperate with communities working in the same areas.**

[24] http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/local_administrative_units

[25] http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction

[26] International Union of Railways http://www.uic.org/

[27] International Civil Aviation Organization http://www.icao.int/

[28] The International Air Transport Association www.iata.org

[29] United Nations Economic Commission for Europe http://www.unece.org/cefact/recommendations/rec_index.htm

[30] **Recommendation 7. Public administrations are encouraged to reuse and share solutions and to cooperate on the development of joint solutions when implementing European public services.**

[31] **Recommendation 17. Public administrations working together to provide European public services should agree on change management processes to ensure continuous service delivery.**

[32] **Recommendation 3. Public administrations should consider the specific needs of each European public service, within the context of a common security and privacy policy.**

- service architecture[35]
- multilingualism[36]

The ESDIN project introduced a semi-automatic quality evaluation process comprising of a quality model (to be described by data producers), a data quality web service (for evaluation), reporting results in metadata and finally a data user web service, which would help data users to evaluate the quality of data. Utilizing this approach the NMCAs can achieve high quality geographic information quickly, realise the advantages of investments and reduce operating costs in the long run. The users will a) rely on data that is trusted and usable b) achieve improved spatial analysis and c) be confident in decision making.

Further, the ESDIN project demonstarted that it is possible to put a generalisation process in place that can automate or semi-automate the production of small-scale data from the updates of larger scale holdings. For details of this as applied to ERM and EGM see ESDIN Final report Chapter 4 Case Studies.

The Geo Product Finder concept is combining legal and technical resources to provide the “missing links” in finding and utilising data and services without replacing what is already working well. The basic idea is to introduce six types of model parameters, with corresponding values. These make up a decision tree, which help a user to find out a set of terms for the licence. The Geo Product Finder helps a user to find the dataset and then use the decision tree for identifying the licence conditions.[37]

Knowing who is attempting to use data access services is important for contributors to the E.L.F. In ESDIN a concrete solution for secure access control was demonstrated using Security Assertation Markup Language (SAML) and the Open Source Shibboleth implementation. This is based on the idea of access management federation as an organisational model.

For sustainable edge-matching maintenance, agreed boundary representations are needed. ESDIN proposes a work process for improving data consistency between neighbouring countries before a fully automated edge-matching process can take place. Stability at the boundaries is achieved by maintaining a “Euro Cross-Boundary Database” of connecting ‘control’ features. An example can be found in the ESDIN final report. EuroGeographics is already working on providing a state boundaries dataset to be available at national level, based on treaties and large scale topographic/cadastral dataset, and Europe regional level, based on EuroBoundaryMap.

4.10 Data products and services

The E.L.F specifications will be used to make EuroGeographics medium-scale data reference data. Derived products may be provided by themes (e.g. administrative, geographical names), coverage, and level of details. Public Private Partnerships (PPP) are envisage for creating derived products.

The NMCAs can utilize the E.L.F. specifications to extend their national specifications in order to provide data for Pan-European/Global use. The E.L.F services infrastructure[38] [39] [40] is proposed based

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[33] **Recommendation 5. Public administrations should formulate together a long term preservation policy for electronic records relating to European public services.**

[34] **Recommendation 15. Public administrations should document their business processes and agree on how these processes will interact to deliver a European public service.**

[35] **Recommendation 13. Public administrations, when working together to establish European public services, should use a common taxonomy of basic public services and agree on minimum service requirements for secure data exchange.**

[36] **Recommendation 4. Public administrations should use information systems and technical architectures that cater for multilingualism when establishing a European public service.**

[37] http://www.youtube.com/watch?v=VlHqekB8BzA

[38] **Recommendation 9. Public administrations should develop a component-based service model, allowing the establishment of European public services by reusing, as much as possible, existing service components.**

[39] **Recommendation 10. Public administrations should agree on a common scheme to interconnect loosely coupled service components and put in place the necessary infrastructure when establishing European public services.**

[40] **Recommendation 22. When establishing European public services, public administrations should prefer open specifications, taking due account of the coverage of functional needs, maturity and market support.**

on INSPIRE architecture. Figure 12 illustrates the technical architecture of the E.L.F. A more detailed explanation of the architecture can be found in ESDIN Technical Architecture report.

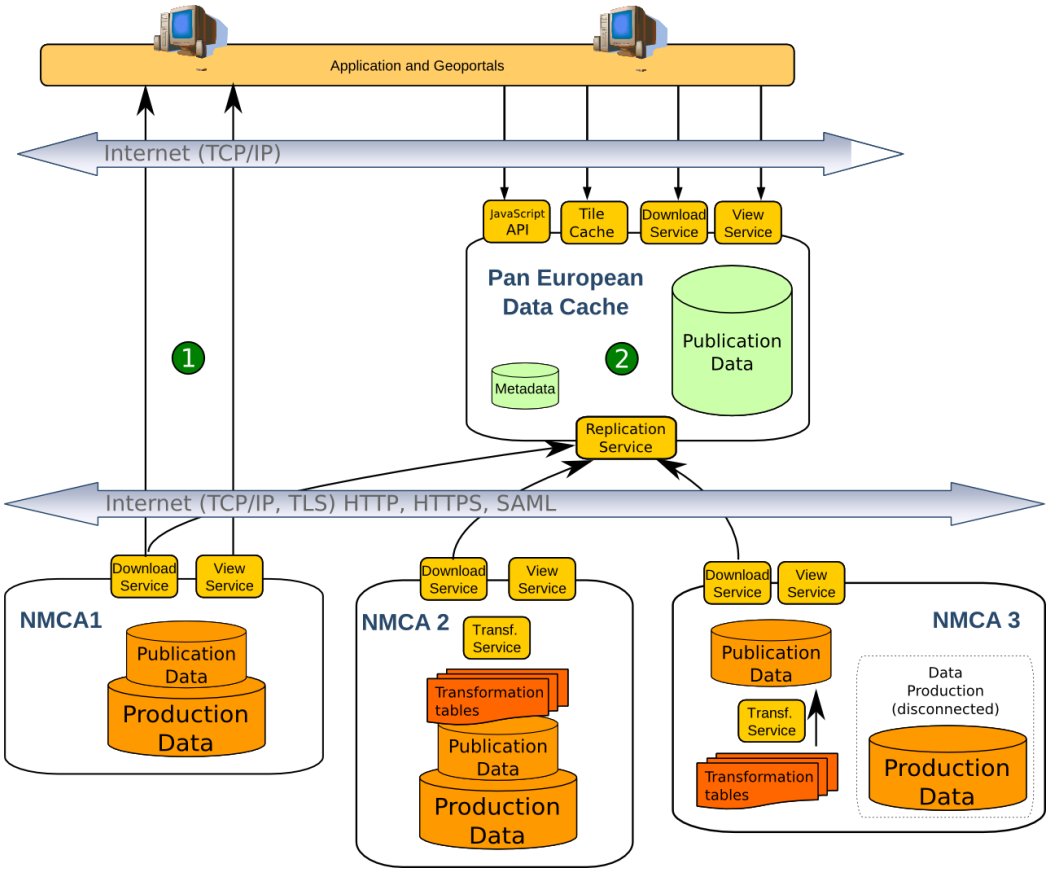

Figure 12 The E.L.F Technical Architecture

4.11 Benefits of E.L.F

For users:

- Consistency between themes, so that themes can be used together in various resolutions;
- Better up-to-dateness and consistency between resolutions. For example feature that is present in national level will be present also in Europe regional and global level if it should be present according to selection criteria;
- Quality conformance levels and metadata enables users to ensure that their requirements are met;
- Maintenance of reference information in user databases. Unique identifiers enable change only updates.
- Reference data provision for European users including European Commission, Eurostat, GMES, EEA, Frontex;

For producers:

- Cost savings in the national production and maintenance processes of European data;
- Common feature type dictionary between resolutions enables use of generalization process in maintenance processes of medium/small scale resolutions which means better up-to-dateness and consistency between resolutions
- Help implementing the INSPIRE directive
- Implementation of interoperability processes including edge-matching between countries to achieve cross-border consistency, quality evaluation and conformance testing, generalization and transformation services
- Increase usage of national data in services, European and global use

Annex I EuroGeographics

Organization

EuroGeographics is a registered[41] not for profit association of the official National Mapping, Cadastre and Land Registry Agencies (NMCAs) of Europe. EuroGeographics[42] members are the custodians of the official and definitive national reference data which provides the source data for creating EuroGeographics pan-European products and services. EuroGeographics strategy aims at achieving 'interoperability of the Members' national land and geographic information assets to provide Europe with an information asset that will support its goal to become the most competitive and sustainable economy in the world.' EuroGeographics currently comprises 56 member organisations[43] from 45 countries with a collective work force exceeding 50,000 people. The members spend over 1 billion euro each year in creating, maintaining and distributing topographic, ownership, land use and other geographic information.

Activities in European SDI

EuroGeographics is a Spatial Data Infrastructure Community (SDIC) in the context of INSPIRE and an active member of the Global Spatial Data Infrastructure association (http://www.gsdi.org/). In addition Memorandum of Understanding facilitating cooperation, joint activities and the ability to draw on the expertise of others are signed with CLGE (http://www.clge.org/), EULIS (http://eulis.eu/home/), Eurogi (http://www.eurogi.org/default.asp), Euref (http://www.euref-iag.net/), EuroSDR (http://www.eurosdr.net/start/), PCC (http://www.eurocadastre.org/) and PSMA (http://www.psma.com.au/aboutpsma/).

EuroGeographics is active in standardisation arena and has a class A liaison status in ISO TC 211 and is a liaison to CEN TC 287. EuroGeographics was leading the work in the ISO 19158 project, which is working to create a technical specification on data quality assurance in data supply processes. It proposes an accreditation scheme for the data providers, which will improve the quality achieved in the production processes. This will decrease the need for quality evaluation after production. Currently this technical specification is under a process of being accepted as DTS in ISO. EuroGeographics is also participating in the ISO 19157 project, which will renew the current data quality standards ISO 19113, ISO 19114, ISO 19138.

The members of EuroGeographics have been major contributors since the outset to INSPIRE and to GMES land monitoring services like Corine Land Cover (CLC). Their contributions to the INSPIRE Implementing Rules and Data Specifications has been substantial.

EuroGeographics has developed a suite of pan-European reference datasets over many years. They represent a significant investment on the part of both the NMCAs and the European Commission.

EuroGeographics products are created and maintained by its member organizations on behalf of the association. Work is led by a product manager supported by regional coordinators and number of technical officers. Overall coordination of product and service development is managed by a product and services co-ordination group which co-ordinates all the product and services created.

All of the EuroGeographics products are subject to regular and routine maintenance for content and currency. Development of the products is currently driven primarily by the requirements of the European Commission, as articulated by Eurostat and the GMES Bureau and by the requirements of the European Environment Agency.

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[41] Association internationale sans but lucratif, AISBL. The Association is governed by Belgian law, and, in particular, is incorporated under the form of a non-profit nature organization in accordance with the title III of the Law of 27 June, 1921 on non-profit organizations, non-profit international organizations and foundations.

[42] http://www.eurogeographics.org/

[43] http://www.eurogeographics.org/about/members

All EuroGeographics products are supported by detailed product specifications and user guides. Currently the products consist of:

- **EuroBoundaryMap (EBM)** is a 1:100,000 scale reference database of administrative and statistical units and regions. It has been available since 1995. Coverage currently consists of: EU27 + EFTA (4) + Croatia, Kosovo, Moldova and Ukraine. More information available at: http://www.eurogeographics.org/products-and-services/euroboundarymap

- **EuroRegionalMap (ERM)** is a multi-functional topographic reference dataset at a scale 1:250,000. Coverage: EU27 (currently excluding Bulgaria) + EFTA (4) + Moldova. More information available at: http://www.eurogeographics.org/products-and-services/euroregionalmap

- **EuroGlobalMap (EGM)** is a 1:1mill scale topographic reference dataset, it has been available since 2004 Coverage: EU27 (**Bulgaria available Q1 2011**) + EFTA (4) + Croatia, Moldova, Ukraine and Georgia (**available Q1 2011**) More information available at: http://www.eurogeographics.org/products-and-services/euroglobalmap

- **EuroDEM** is a digital representation of the ground surface topography of Europe. Coverage: EU27+EFTA (4) 0+ Croatia, Kosovo, Bosnia & Herzegovina, Serbia, Montenegro, FYROM, Moldova and the Kaliningrad area are covered. More information available http://www.eurogeographics.org/content/products-services-eurodem

- **EuroGeoNames (EGN)** is a gazetteer service providing geographical names, which may be an endonym or an exonym, about places and geographical features/spatial objects (or in ISO parlance 'location instances') in Europe. By the end of 2009 EuroGeographics had 3.5 million entries covering 14 European countries. The target is for coverage to at least EU27 by 2014. More information available (www.eurogeonames.org)

Current product and project developments

- **State Boundaries of Europe** In addition to the current products and services, EuroGeographics is working to create a database of precise geometric definitions for the State Boundaries of Europe covering both land and marine borders. (http://www.eurogeographics.org/sbe).

Knowledge Exchange Networks and co-operation with other European and International organizations

EuroGeographics is running a number of knowledge exchange networks where it identifies best practices among its members and organizes workshops for larger audiences. The areas covered include inspire,quality, standards, cadastre & land registry, European policy issues and business interoperability. Each of the group has a nominated chair and a co-ordination group and EuroGeographics sets annual targets for each of them.

EuroGeographics is working closely with number of other organizations in order to develop the European Location Framework http://www.eurogeographics.org/about/partners.