

# **The Process of Spatial Data Harmonization in Italy**

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## **SUMMARY**

The acknowledgement of the INSPIRE Directive in Italy identifies the qualified subjects involved in the implementation of the Directive, the deadlines, and how to achieve the objectives of the European Directive.

Following the development of the use of geographic information on the base of the European initiatives, and thanks to the support of the public and private sector, the number of Italian portals with geographical information has considerably increased at national and regional level.

In order to set up a more immediate and easy communication between all the professionals and researchers interested in sharing geospatial information according with INSPIRE, associations and National Interest Group for INSPIRE have been created.

These initiatives want to facilitate the matching of the most important experiences in the sector and the sharing of ideas and initiatives to spread awareness in the Italian geospatial community about the INSPIRE Directive and how it is implemented in Italy.

The association AM-FM GIS (the CNGGL is an honorary member) promotes the exchange of knowledge and experience between public and private sector of Geographic Information Systems (LIS/GIS) and Geographical Information (GI) and promotes the development of applications for land management, services and infrastructure. Moreover, it promotes the dissemination of methodologies and processes of standardization, communication and sharing of geo-data in order to promote interoperability between different systems and regulatory changes. It works on the legislative measures to ensure the development of an Italian Geographic Information Infrastructure, consistently in line with the programs of the European industry; represents the interests and proposals of the Italian operators in the sector GI, European and international contexts.

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## 1. INTRODUCTION

Geospatial Information in Europe is characterized by the lack of harmonization, particularly referring to the datasets produced at different geographical scales, from different and fragmented sources of information. In some cases the problem is the lack of data or the duplication of data. The challenge of the INSPIRE project is to create a European Union (EU) spatial data infrastructure. This will enable the sharing of environmental spatial information among public sector organisations and better facilitate public access to spatial information across Europe.

Several European projects have been born with the main objective to make geo-spatial information more accessible, usable and exploitable by potential users by providing consistent digital databases, aggregated and always updated. A good example is the GIS4EU<sup>1</sup> project (Italy is a partner), which objective is to increase communication and networking relationships among the project partners addressing cross scale, cross language and cross border interoperability and accessibility issues. The project defines a common data model in order to enable access to consistent and homogenous reference data provided by cartographic authorities of different countries and at different levels (national, regional and local) and identifies the rules to aggregate data by solving problems related to the adjacency of different databases, data generalization and multilingualism.

The different geo-spatial and cartographic data, provided by the 10 data-providers involved in the consortium, will be made available and harmonized into a single data model. These data will be accessible through the web, and interoperable as if they were put into a single centralized database. In this way, the cartographic data continues to be maintained and published by individual data providers but at the same time, it can be integrated and aggregated to other available data, creating a single virtual geographic database. The common

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<sup>1</sup> <http://www.gis4eu.eu/>

data model and the related services will be designed and developed on the basis of the Implementing rules of the European INSPIRE Directive.

The recognition of the INSPIRE directive in Italy has identified the qualified subjects involved in the development of the Directive, the deadlines and how to achieve the objectives defined by the European directive.

This paper aims to highlight the impact that the INSPIRE Directive had at national level leading to the creation of many portals containing geographic information, both at national and regional level. The social impact of the regulations has created a wide awareness between local authorities and the Italian professionals which adhere to associations and interest groups for INSPIRE.

## **2. INSPIRE DIRECTIVE IN ITALY**

The European INSPIRE Directive has been acknowledged in Italy through the Legislative Decree "Implementation of Directive 2007/2/EC establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)". The decree is aimed at creating a national infrastructure for spatial information and environmental monitoring to allow the Italian State participating in the infrastructure for spatial information in the European Community (INSPIRE) for the purposes of environmental policies and policies or activities that may affect the environment. The decree defines general rules for the data exchange, sharing, access and utilization, in an integrated approach within regional and local stakeholders. It is applicable to all spatial data that are available in electronic format and are held by any public administration. In Italy Ministries, institutions and agencies, collect and produce spatial data standards under regulations that often conflict with each other generating sometimes duplication, overlap and waste of public resources. The Ministry of Environment has authority and responsibility for the implementation of the decree prescribing measures and coordination; it commits to public authorities the provision of metadata. The public authorities responsible for the production, management, updating and distribution of spatial data and the related services, allow the public to access spatial data through research services, consulting services, services for downloading data, spatial data conversion services. Data

interoperability is achieved through service easy to use, available to the public and accessible via the Internet<sup>2</sup>.

### **3. THE GEO-PORTALS**

Following the intensification of the use of geographic information and on the basis of European initiatives, in Italy there has been an increase in geographic information portals both at national and regional levels.

#### **3.1 National Geoportal**

The National Geoportal, the main Spatial Data Infrastructure in Italy, act as driving force for all public administrations pushing them in the adoption of the terms of the INSPIRE Directive, to the sharing of free geospatial data through interoperable services increasingly improved, recognized and worldwide adopted, according to the Open Geospatial Consortium Standards (OGC)<sup>3</sup>.

The concept of Spatial Data Infrastructure (SDI) is the principal expression of the concept of interoperability defined by the INSPIRE Directive, aiming at regulate the dissemination and sharing of geospatial data<sup>4</sup>.

What it is necessary for the implementation of an SDI are the technologies and the political cooperation agreements and understandings on the production, management, updating and dissemination of data you intend to make available.

A SDI is conceived as an organized system in which a network of cooperating and responsible subjects is in charge for the management of spatial information. This system is designed to facilitate quick access to information to support decision making on territorial matter, with interactive features that ensure the uniqueness of the data, their documentation and interoperability. To make this possible the data is made available through the use of free services and standards universally recognized, the Open Geospatial OGC Standards Consortium (Figure 1).

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<sup>2</sup> L. Surace, 14a Conferenza nazionale ASITA, in Geocentro n. 13 Gennaio-Febbraio 2011, pp 80-84.

<sup>3</sup> <http://www.geospazio.it/ogc.html>

<sup>4</sup> <http://www.geospazio.it/index.php>

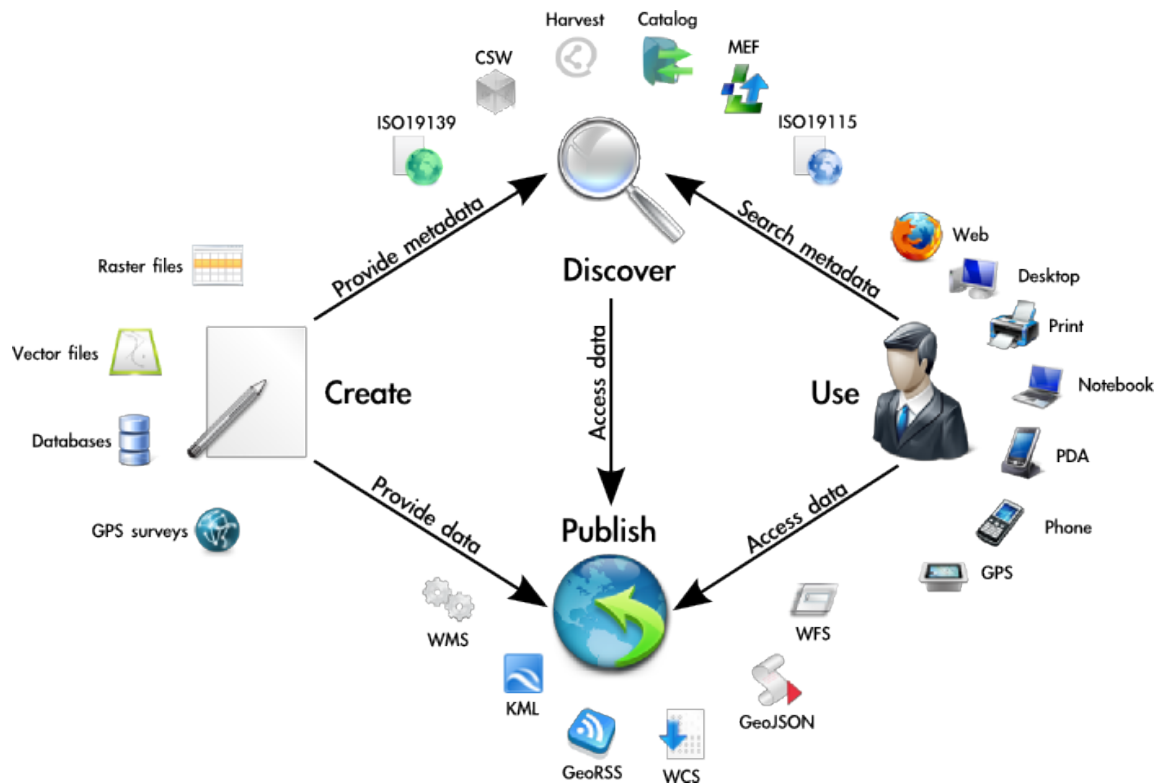


Fig.1: Conceptual structure of territorial data Infrastructure

The SDI should ensure the following functions:

**Consultation** which allows the visualization of spatial data and the related geographic information with metadata;

**Library** to provide access to spatial data and meta-information about Web services distributed by the Region by remote applications;

**Download** a complete copy of the spatial data sets or part of them.

**Research** which allows the search for spatial data sets and spatial data services, by displaying the data and corresponding metadata;

**Geocoding**, which enables searching some significant features such as cities, towns, localities and display geographically on a map, specifying the name;

**Transformation** in other coordinates systems.

The management and updating of the available information will be done by the various agencies that own the data, which will grant a license to use the data and provide information (metadata) about them.

This will allow different kind of users, from technical authorities, professionals, private entities, scientific researcher and to citizen, to have access and use the spatial information.

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### 3.2 Geoportals at regional level

The majority of Italian regions are provided with a Spatial Data Infrastructure (SDI), now commonly referred as Geoportal, from which it is possible to retrieve local spatial information, either by downloading them or through the interoperability services defined by OGC standards.

Here following is an example of the Geoportal of Puglia region<sup>5</sup>.

The portal of Puglia, as well as some areas that are accessible only to institutional entities, provides areas accessible to businesses, professionals, organizations and citizens (fig.2)

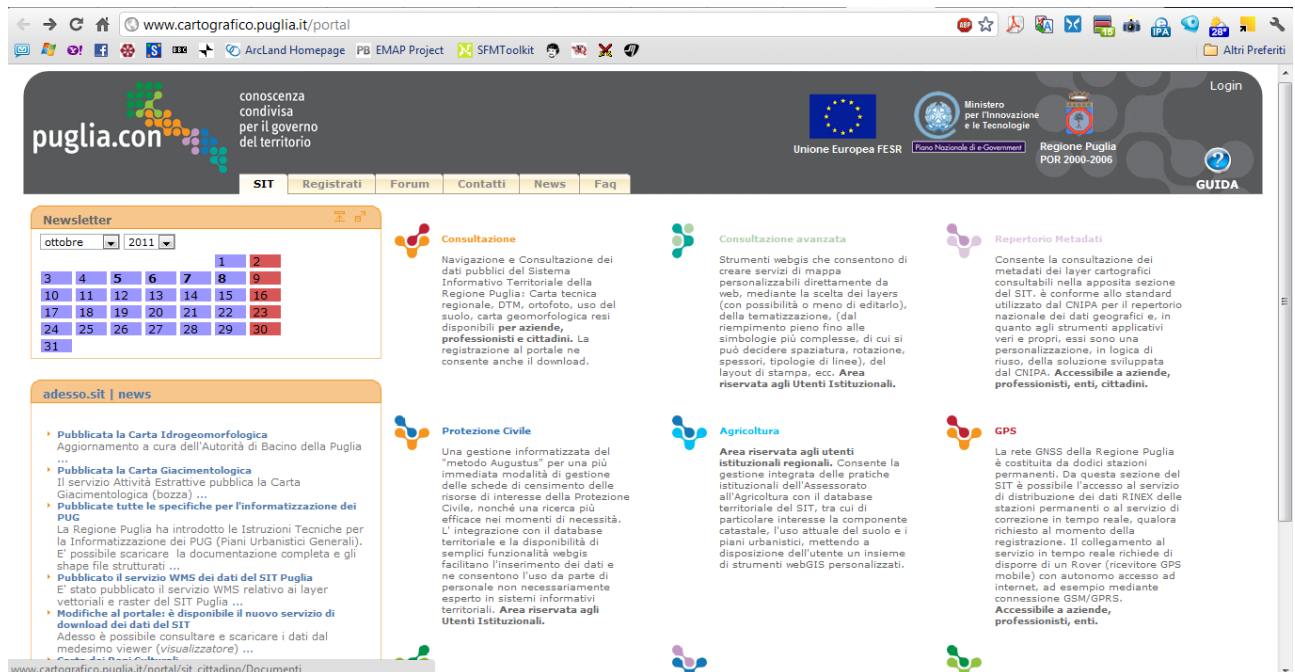


Fig 2: Regione Puglia geoportal

In particular the Regional Spatial Data Repository (RRDT) is a catalog of metadata based on ISO19115, 19119 and 19139, consistent with the INSPIRE directive and the European Regulation on the metadata. It is a public registry that allows knowing with certainty the new databases available in the Regional GIS, their technical characteristics and how to use them. In the near future Puglia Region expects to update the catalog with all available data, including historical information.

The Regional Spatial Data Repository (RRDT) reuses the National Spatial Data Repository (RNDDT), born with the primary purpose of supporting the interoperability in the field of

<sup>5</sup> <http://www.cartografico.puglia.it/portal>

geographic information, facilitating the harmonization, accessibility and reuse of the huge amount of spatial data created and / or managed by public bodies and, consequently, the integration of data pertaining to more than one administrations. Specifically, the available features allow:

- Consultation of the metadata of spatial data through the use of simple alphanumeric masks;
- Extended mode consultation through the use of a geographic browser;
- Management of metadata reserved to public administration offices.

Fig 3: Consultation of spatial metadata mask

In addition to metadata about the territorial data, the catalog contains metadata for local services made available by the Regional Territorial Information System-SIT (service planning, urban planning, civil protection, etc..). The RRDT allows the management and publishing of:

- Metadata for spatial data (maps technical issues etc.);
- Metadata about local services
- Metadata for new recorded spatial data.

#### 4. INTEREST GROUP FOR INSPIRE

One of the phenomena that reflect the growing interest by technicians, professionals and researchers to spatial data harmonization and interoperability issues is the increasing number

of associations and interest groups that work together and share their point of view through the web.

Among these associations it is important to mention the AMFM GIS Italy<sup>6</sup>, which the CNGGL is an honorary member as the owner of expertise in the field of GI. This association, nonprofit, was founded in 1990 to promote the exchange of knowledge and experience between public and private sector of Geographic Information Systems and promoting the development of applications for local governance and management services and infrastructure.

The Association promotes the methodologies and processes of standardization, communication and sharing of geographical data in order to promote interoperability, promoting legislative and regulatory adjustments necessary to ensure the development of National Spatial Data Infrastructure (IDT), consistent with the programs of the European industry, in particular with the INSPIRE Directive.

This portal includes participation in discussion groups on:

- 3D GIS
- Cadastre
- GIS and Technological Networks
- Security and Defense
- European Union
- Standard.

## 5. CONCLUSIONS

This work is a state of the art on the initiatives ongoing on the Italian territory for the creation of a national Geographic Information Infrastructure.

The significant increase of geoportals at national and regional level and the rise of interest groups and blogs that address their interest on issues about interoperability and standardization of spatial data, promote the exchange of knowledge and experience between public and private stakeholders and reflects a growing awareness by local authorities and governments, on issues dictated by the European directive INSPIRE

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<sup>6</sup> <http://www.amfm.it/associazione/soci.php>



The sharing of data and the associated management of spatial information and all available geographic data will be an important support for the Central and Local Public Administration for better managing, controlling and planning the territory in a more precise way allowing the reuse of existing data and providing cost savings.

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