



Spatial Data Infrastructures in *Italy*: State of play 2010



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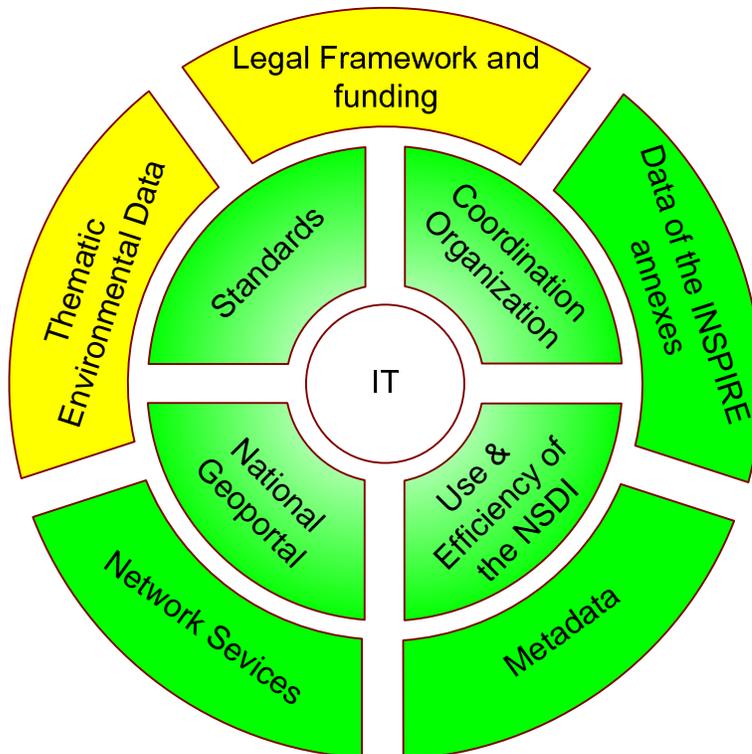
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Change matrix 2010 versus 2007

A concise graph is added to indicate changes of the various paragraphs compared to the previous report. Two colours are used: Green and Yellow indicating major and minimum changes respectively compared with the 2007 State of Play. This graph does not reflect the country situation. Merely it represents our findings/changes per section on our preparation of the desktop analysis



Executive summary

The National geo-portal has been brought online providing access to a multitude of SDI-like services (access to metadata, web mapping, ordering of data) put in place by various administrations across the country. The portal is developed guaranteeing that the data, metadata and information systems can be managed at the level where they have been developed while through the geo-portal, access is provided to anybody anywhere. The portal is aimed to become also the INSPIRE national geo-portal.

A vision and plan exists to systematically extend and upgrade the geo-portal so that it becomes a reliable and stable point of access to the extremely distributed but more and more harmonized repositories of GI in Italy. At the same time several portals are now available at regional level or for some big municipalities.

With the emerging of INSPIRE, several new initiatives saw light, at national and regional level: SITAD (Piemonte), SITR (Sardinia) and SIGMA TER (inter-regional) are three of them. All of these aim at improving the accessibility to geographic information for public authorities and the citizen as well. The initiatives rely on the application of international standards and the guidelines from the National Centre for IT in Public Administration (CNIPA).

CNIPA operates at the Presidency of the Council of Ministers for the implementation of policies formulated on behalf of the Government by the Minister for Reforms and Innovation in Public Administration, with a mission to help to create value for citizens and businesses, providing support to this innovative use of information.

Furthermore, the Italian Ministry of Environment, in collaboration with ANCI, the National Association of Local Municipalities, has set up a system of projects, among which the one called “Ambiente in Comune” that provides both a national catalogue with spatial datasets and services, and a view service, including WMS and WFS tools, tested with INSPIRE geoportal.

Moreover, the final text on INSPIRE transposition has been published (Decreto Legislativo 27.01.2010 n. 32 published in Supplemento Ordinario alla Gazzetta Ufficiale della Repubblica Italiana n. 56 del 9 marzo 2010).

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Abbreviations and acronyms

AGILE	Association of Geographic Information Laboratories in Europe
AIC	Associazione Italiana di Cartografia
AIPA	Authority for the Informatics in the Public Administration, Regions and Provinces
AIT	Associazione Italiana di Telerilevamento
AM/FM	Automated Mapping Facilities Management
ANCI	National Association of Local Municipalities
ASITA	Federazione delle Associazioni Scientifiche per le Informazioni Territoriali ed Ambientali (Federation of Italian scientific associations for geographic and environmental information)
CIGA	Air Force Geo-topographic Information Centre
CIRCE	Centro di servizi Interdipartimentali di Rilievo, Cartografia ed Elaborazione
CNIPA	National Centre for the Informatics in the Public Administration (Centro Nazionale per l'Informatica nella Pubblica Amministrazione)
CNR	National Research Council
CRS	Cartographic Reference System
CT	Core Thematic Data
CTC	Coordination Technical Committee
CTSGI	Committee for Technical Rules on Geographic Information (Comitato per le regole tecniche sui dati territoriali delle Pubbliche Amministrazioni)
DCP	Department of Civil Protection
DIGITPA	National Agency for Digital Administration
DSA	Directorate for Environmental Protection (Direzione per la Salvaguardia Ambientale)
EC	European Commission
EPRS	Extraordinary Plan of Environmental Remote Sensing
EUROGI	European Umbrella organisation for geographical information.
FIR	Further Investigation Required
GDSC	Geographic Data Service Centre
GI	Geographical Information
GIIDA	Integrated Management of the Environmental Data
GINIE	Geographic Information Network in Europe
GIS	Geographical Information System
GISFORM	GIS Forum
GML	Geography Markup Language
HA	Hydrological Analysis

IGM	Italian Military Geographical Institute
IIM	Navy Hydrological Institute
INSPIRE	INfrastructure for SPatial InfoRmation in Europe
IRPI	Institute for Geo-Hydrological Hazard Assessment
ISO	International Organization for Standardization
ISTAT	National Statistical Institute
IUAV	University of Venice Faculty of Architecture,
JRC	Joint Research Centre
LABISTA	Environmental and Urban GIS Laboratory
MD	Ministry of Defence
METS	Ministry of Environment and Territory of the Sea
NCP	National Cartographic Portal
NIA	No Information Available
NMA	National Mapping Agency
NSDI	National Spatial Data Infrastructures
OGC	Open Geospatial Consortium
PCN	Portale Cartografico Nazionale
PNC	National Cartographic Portal
PPP	Public-Private Partnerships
PSI	Policy and legislation on access to public sector information
REF	Reference data
RNDT	Spatial Data National Catalogue (Repertorio Nazionale dei Dati Territoriali)
SCR	Cartographic Reference System
SDI	Spatial Data Infrastructures
SDT –	Sistemi Informativi
SIFET	Società Italiana di Fotogrammetria e Topografia
SIGMA TER	Servizi Integrati catastali e Geografici per il Monitoraggio Amministrativo del TERRitorio
SITAD	Sistema Informativo Territoriale Ambientale Diffuso
SITR	Territorial Information System of Sardinia
SPC	Public Internetworking System
TQA	Topographic Quantitative Analysis
UPI	Union of the Italian Provinces
UTM	Universal Transverse Mercator
WFS	Web Feature Service
WMS	Web Map Service
WSI	Web Services Interoperability

1 GENERAL INFORMATION

1.1 Method

This report is summarizing the state of play of SDI in Italy, and reflects the degree to which the SDI situation in Italy is similar to the ideas set out in the INSPIRE position papers¹ and the more recent INSPIRE scoping documents.

The 2002 report was based mainly on the analysis of web sites readily accessible and on documents presented during several workshops and conferences. Completing and correcting remarks have been provided by the Italian team of INSPIRE experts. Additional information has been provided by Mr. Annoni from EC-JRC, for the 2003 version and for the 2004 version as well. For the update of 2005 the Italian Authorities were contacted, but no new information was received. Some of the legal information was updated and input was received on the new decree currently under preparation from Labsita, University of Rome. For the 2006 update we relied on various sources (web portals) including information obtained through the different presentations during the EC GI&GIS workshop in Innsbruck, June 2006. The structure of the report has been reviewed in order to bring it more in line with the INSPIRE Directive. Additional information was received from the Italian Authorities and was added early 2007. For the 2007 update, information was received through CNIPA regarding the functioning, the data sets and services.

For the 2009 update the survey report was used along with the information extracted from the web and the various presentations/publications from workshops and conferences. In this version obsolete information was removed, while a conclusion paragraph regarding the status of each indicator was added for each component.

1.2 The NSDI-scene in Italy

In Italy the official producers of medium to small scale nation-wide GI (according to the Law n.68 of the 2/2/1960) are:

- The Cadastral Agency (recently converted to the Agenzia del Territorio) of the Ministry of Finance;
- The Navy Hydrographical Institute (IIM);
- The Italian Military Geographical Institute (IGM);
- The Air Force Geo-topographic Information Centre (CIGA);
- The National Technical Services.

In addition to those also the National Statistical Institute (ISTAT) is actively involved in GI data collection and dissemination (e.g. census units).

¹ INSPIRE position papers, final versions: RDM, ETC, DPLI, ASF, IST, IAS (latest version).

Large-scale topographic mapping is however undertaken by the municipalities, provinces and regions for their own territory. In addition recently the responsibility to update cadastral data is given to local municipalities and the new Agenzia del Territorio has a more coordination role.

As a reaction to the increasing decentralisation, the national and many of the lower level authorities are since a few years involved in the development of a so called common Cartographic Reference System (CRS) or Federated Cartographic System, which has many features of an NSDI. It is based to a large extent on the efforts of some municipalities and almost all Regions to develop their own infrastructure as well. A first agreement was signed 26 September 1996 called “*Intesa Stato Regioni e Province per I Sistemi Informativi Geografici*” to better coordinate the creation of GIS in Italy involving several ministries and public administrations such as AIPA, the Authority for the Informatics in the Public Administration, Regions and Provinces, The Communes (ANCI), the Comunità Montane, ...).

The *Intesa* was amended in the year 2000. It specifies three major objectives:

- The production of common technical specifications;
- The production of data compliant with the technical specifications;
- The production of activities aiming to publish or make available the GI through the production of cartographic catalogues.

With regard to the third objective, the National Digital Mapping Portal and a nation-wide network infrastructure were developed to satisfy the need to guarantee the full functionality with every end-point (Client), avoiding complex and expensive customizations.

The network infrastructure (Federal Network Information System) is designed to exchange geo-spatial and other data efficiently between a central Body: the National Digital Mapping Portal and a network of peripheral nodes: the Federal Administrations initially limited to the Nation and then expandable to other European and International countries. The approach adopted is the same used to realize a Federal Information System in which heterogeneous systems share the same conceptual model. The National Digital Mapping Portal hosts the CRS set of national information layers and a common database, while the Federal nodes offer the local informational layers and their own databases. Every single Federated system has a component which acts as an interface towards the Federation itself hiding the local complexity and data, translating their own schema into the Federal schema. This component guarantees the extensibility of data schema, both local and Federal, being the two models not coupled.

The Federal architecture described above has been designed and developed by the Ministry of Environment and Land Protection to link the needs for data quality and data diffusion, in order to be compliant with the cooperation and integration guidelines, and at least to allow any update coming directly from the subject which controls the land.

An abstraction level was required and developed to avoid the pitfall of choosing a particular operating system, or a dedicated application, or a GIS platform that can reduce the accessibility to the data stored and provided by the National Digital Mapping Portal.

To accomplish this, the solution had to be based over an Internet multi-layer architecture, and had to follow and adopt the market standard protocols to exchange the needed information, according to local and European guidelines for cooperation and data integration.

The Ambiente in Comune (<http://cart.ancitel.it/>) has established the PROJECT ENVIRONMENT IN TOWN. The project is created with the objective of ensuring the availability of a system of environmental and spatial data that are constantly updated and reliable. The system is currently fuelled by some 300 municipalities participating in projects in the City Environment, Small Towns and monitor between ANCI and the Ministry for the Environment, Land and Sea, and the Ministry itself. The system of territorial and environmental data is accessible through a metadata catalogue that describes the data for their correct use, and through a catalogue of mapping projects that allow to access the data in aggregated form through specific views and thematizations. The infrastructure is constantly evolving in line with the provisions of Directive 2007/2/EC INSPIRE and currently the metadata catalogue includes 833 datasets.

At national level the CRS and the National Mapping Portal Federated Network (<http://www.pcn.minambiente.it/PCN/>) are put in place, while the Coordination Centre of Regions (Centro Interregionale di Coordinamento e Documentazione per le Informazioni Territoriali) (<http://www.centrointerregionale-gis.it/>) focuses its efforts on the construction of basic levels of topographic maps (DB Topografici Prioritari 10.000) from the various regional and local sources and on the metadata catalogue (<http://www.centrointerregionale-gis.it/script/documenti.asp>).

The Directorate for Environmental Protection (DSA, Direzione per la Salvaguardia Ambientale) of the Italian Ministry of Environment and Land and Sea Protection is responsible for several environmental assessment procedures and is committed to encourage policies of cooperation between private and public sectors, in order to propel the use, and above all the “re-use” of environmental information. The DSA in partnership with INVITALIA, the national Agency for Inward Investment Promotion and Enterprise Development, are developing an integrated platform of spatial and environmental data and information, with facilities and services to be specifically offered to enterprises and public administrations for all sorts of environmental assessments.

At the same time, the Italian Ministry of Environment, in collaboration with ANCI – National Association Local Municipality, has also set up a system of projects which provide both a national catalogue service for searching spatial datasets and services and a view service, which includes WMS and WFS tools, tested with INSPIRE geoportal.

With the development of the INSPIRE initiative, the work in and between regions, and at the national level has been intensified. Several initiatives have been taken. Some examples could be mentioned:

The SIGMA TER initiative (Servizi Integrati catastali e Geografici per il Monitoraggio Amministrativo del TERRitorio) is an inter-regional e-government project aiming at providing integrated cadastral information to the public and private stakeholders by using a standardized approach within a distributed and service oriented environment. The initiative is developed within the context of the decentralization of cadastral activities (L. 59/97, D.Lgs. 300/99, D.P.C.M. 19/12/00, D.P.C.M. 21/03/01), the e-government plans at the national and regional level and the standardization work of INTESA, CNIPA, W3C, ISO, OGC and INSPIRE. The Cadastral Authority works with 5 regions (Abruzzo, Emilia-Romagna, Liguria, Toscana and Valle d'Aosta), 5 provinces (Bologna, Genova, Parma, Piacenza and Pisa), 12 municipalities, 2 mountain communities and several technical boards (ANCI, UNCEM, ...). Also private partners are collaborating. The project budget is around 21,5 million €. There are 150 re-user bodies in the initial phase and 8 new regions will come on board during the project. SIGMA TER is also a SDIC. The initiative relies on the experience of the different partners in the field of SDI development (data, metadata, services, standards, ...). It aims now at implementing an inter-regional SDI. (<http://www.sigmater.it/>)

The use of standards is a key concern. Both national and international standards are applied: for data and spatial schema's (ISO19107, ISO14825), for metadata (ISO19115:2003, ISO/DTS19139:2005, ISO15836 and guidelines from CNIPA), for services (WMS 1.1.1, WFS 1.0, SLD 1.0, GML 3.1, CML – XML for cadastre). For data exchange XML is used, together with SOAP, XSD, J2EE (for applications development) and W3C for standard interfaces. The CNIPA national technical specifications are guiding the work (UDDI). SIGMA TER is a national leader on the use of international standards related to GI (ISO19100 series) and services (W3C, OGC) that allows the cooperation and interoperability between different systems and data

An architecture based on services has been developed. There are services with cadastral information (18), metadata services (8), download services (4), gazetteer services (9) and services with fiscal information (5). General purpose applications were developed for: map browsing, municipal tax, cadastral data access, fiscal certifications, urban development certifications, house purchasing, housing permits, environment authorization, farm funding and more general metadata search and export.

Important lessons have been learnt:

- More emphasis should be made on cadastral identifiers (parcel-ID's).
- The relationship between cadastral and topographic objects needs to be studied in detail.
- There is a need for a legal basis and workflow on how to exchange the updates of data.

- Although SIGMA TER is completed and the PSI Directive has been adopted by Italian Government, the PSI law still needs to be better defined and public access to data has not been regulated yet.
- The SIGMA TER saves the Public Authorities an estimated 2% of time. External savings are important as well.

<http://www.sigmater.it/>

Another initiative to be mentioned is the SITR (Territorial Information System of Sardinia). SITR aims to be a federated unitary architecture, based on the sharing of geographic, urban, environmental geo-referenced data for Sardinia. It wants to gather process and manage in a standardized and coordinated way the geographic and related information. The system should support the territorial policy of the Regional Government. SITR is based on services and therefore fits in the Italian SDI efforts. Users of the system will be the Sardinia Region, the national and other regional governments, the local public authorities, professional sector and agencies, as well as the citizens. With SITR, the Sardinia Region will be able to interface with other Public Authorities, use common shared data. The professional sector will use the geo-data to support their work, while the citizen will be able to use specific services or just take a look on existing information.

The architecture of SITR consists of a data layer, a service layer, an integration layer and a user layer. Following standards have been adopted: OGC (GML, WMS and WFS), WSI – Web Services Interoperability Organization, ISO 19115 and 19139, INSPIRE Implementing Rules and the use of CNIPA's Open PDD that allows interaction by means of the E-government envelope. Important features will be: the interoperability, the re-use of software, services and data, and the use of OSS.

At the applications side, there are a simple, advanced and 3D navigator, together with a metadata catalogue, a toponym catalogue, a master land plan viewer, an urban planning application and aerial photo viewer. Finally, a, urban and building observatory, seaboard e-corridor, an environmental and cultural patrimony manager are provided as well.

<http://sardegнатerritorio.it>

The last example is the Region of Piemonte where the SITAD initiatives has been taken (Sistema Informativo Territoriale Ambientale Diffuso) to resolve the problems of lack of harmonization of geographic data, as well as the lack of a coordinated approach for exchanging geographic information. SITAD works on standardization for data and services. SITAD wants to promote the best local and regional practices and transfer them in coordinated dissemination actions. Collaboration is sought at international level (within the INSPIRE initiative, JRC, UNINFO) and at the national level (CNIPA, IntesaGIS,). A newsletter, forum, etc., have been setup. SITAD general rules of use aims at setting the boundaries for collaboration with all the stakeholders.

Besides the well developed SDI initiatives, there are a lot of other GI-co-ordination efforts at the national and regional levels, with several associations aiming at bringing together GI players and promoting GI & GIS in particular sectors. Some important associations are:

- AM/FM Italia, Automated Mapping Facilities Management – GIS (<http://www.amfm.it>) - It is the representative for Italy in EUROGI. The aim of the association is to promote GI & GIS in Italy, to disseminate information and knowledge of GI within Italy, to increase collaboration between partners in the GI & GIS sector and to foster coordination among the partners. AM/FM holds conferences, workshops and it publishes a newsletter. It does not deal directly with organizational or technical and data issues. It also encourages the necessary legislative and regulatory changes to ensure the development of '**National Spatial Data Infrastructure**', in line with European programs in the industry, in particular with Directive [INSPIRE](#). Of interest is the yearly organization of geoportal awards. The portals are evaluated via two ways: usability and adequacy of technological solutions along with the efficiency of communication of WebPages.
- SIFET, Società Italiana di Fotogrammetria e Topografia (Italian Association of Photogrammetry and Topography) (<http://www.sifet.org/>) ;
 - AIT, Associazione Italiana di Telerilevamento (Remote Sensing Italian Association) (<http://www.asita.it/ait/>);
 - AIC, Associazione Italiana di Cartografia (Italian Association of Cartography);
 - ASITA, Federazione delle Associazioni Scientifiche per le Informazioni Territoriali ed Ambientali (Federation of Italian scientific associations for geographic and environmental information - <http://www.asita.it>). This federation plays an important role coordinating the 4 above mentioned organisation. It is organizing the Italian annual conference on GI-GIS with thousand participants;
 - GISFORM, GIS Forum (<http://www.gisform.it>) - is an association that focuses on the creation of a specialized centre with private and public partners that aims at supporting the development and dissemination of GI throughout Italy.

Some research initiatives can also be mentioned:

- University of Rome “La Sapienza” Faculty of Architecture:
 - Master “GIS for Land Planning” Research Laboratory (<http://www.gis-school.com>);
 - Environmental and Urban GIS Laboratory LABSITA (<http://151.100.2.42/labsitaweb/index.html>) Italian node of AGILE

(Association of Geographic Information Laboratories in Europe)
Network;

- University of Venice Faculty of Architecture, IUAV, CIRCE (Centro di servizi Interdipartimentali di Rilievo, Cartografia ed Elaborazione) centre for GIS and mapping (<http://circe.iuav.it>);
- University of Trieste - GEOLab Geomatic Laboratory (<http://www.univ.trieste.it/~geolab/>);
- TELEGIS Laboratory. University of Cagliari. <http://www.unica.it/telegis/> .

2 Details of the Italian common Cartographic Reference System based on the “INTESA”

2.1 General Information

Official address:

Main co-ordinator of the SDI is the Ministry of Environment and Land Protection (Ministero dell' Ambiente e della Tutela del Territorio)

Via Cristoforo Colombo, n. 44
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With the decentralisation of the 1970s the 20 Italian regions became responsible for land-use planning and territorial management and in 1990 a second decentralisation gave powers to the 103 provinces in respect to environmental management. At the same time, coordination remains a function of the central administrations. The highly decentralised Italian organisation of society deeply marks the development of the Italian SDI. Given the strong regional dimension to the collection and maintenance of GI, coordination tends to be from the bottom up rather than from the top down.

2.2 Component 1: Coordination and organizational issues

A first step towards a more coherent GI policy was taken in 1996 when the national, regional and local authorities for territorial matters reached an agreement (*Intesa Stato-Regioni-Enti Locali sui Sistemi Informativi Geografici*) for the development of a common Cartographic Reference System (SCR). This agreement also established the Technical Coordination Committee (CTC), a coordination body that consists of representatives from various administrations. A second major step towards the establishment of an SDI organisational framework was the multi-agency and multi-level agreement of 2000, signed inter alia by several ministries, the NMAs, the regions, provinces and municipalities. The core of this agreement is that state and regions agree on the necessity to concentrate all efforts towards the coordinated development of geographical databases

which are essential for the creation of the GI systems of the public administrations at national, regional and local level.

Overall coordination of the NSDI rests with the Ministry of Environment and Land Protection (<http://www.minambiente.it>), with a Steering Committee representing the agencies signatory to the agreement, and supported by the CTC.

Art. 59 of the “*Digital Administration Code*” (Decree n. 82, March 7 2005) establishes the “*Committee for Technical Rules on Geographic Information*” (CTSGI, “Comitato per le regole tecniche sui dati territoriali delle Pubbliche Amministrazioni”); the role of the Committee is to define technical rules to be used by any public administration when setting up spatial databases, as well as to specify the documentation and the usability and to implement data exchange between central and local Administrations.

The Committee is made up of representatives of the central administrations, local bodies and Regions. It was formally established through the Decree of Ministry Council President of August 30, 2007 and it began its activities in September 2007. The CNIPA, National Centre for the Informatics in the Public Administration (“Centro Nazionale per l’Informatica nella Pubblica Amministrazione”) is a member of the Committee and acts as well as technical secretariat, in particular providing technical and scientific support.

The CTSGI meets usually monthly and has organized working groups involving representatives of other authorities and associations which, although not represented on the Committee, are playing a significant role in the context of geographic information and, therefore, are called to participate in the activities of CTSGI.

With particular reference to issues related to implementation of the Inspire Directive, the Committee established a WG about the national spatial data infrastructure (NSDI) whose aim is to define the logical, organizational and technological aspects about Italian NSDI and a WG about the “Spatial Data National Catalogue”(RNDDT, “Repertorio Nazionale Dati Territoriali”), of which the CTSGI states the technical rules for the definition of the content, the composition and subsequent updates of RNDDT.

RNDDT is established by the same art. 59 and is operated by CNIPA. It is a public register which is used to know, with full legal value, the availability of the spatial data of all Italian public sector bodies, which are their basic characteristics and how it is possible to use them; RNDDT also aims at developing services based on the integration of data collected by different bodies, and it collaborates to Central Government, local and regional agencies in order to plan the collection of new data.

CNIPA has developed a prototype of RNDDT through the use of open source software; this prototype is currently being tested involving various authorities at central, regional and local levels.

The CTSGI, through the WG, is going to identify general interest data that will be documented in RNDT and to define the relevant technical requirements, taking into account the INSPIRE Implementing Rules about Metadata.

The RNDT will collect metadata on spatial data and related services and it could be configured as a discovery service as required by Inspire Directive. It also will include the technical possibility, for public authorities, to link their spatial datasets and services.

A specific working group has been established within the CTSGI aiming at defining the technical rules to improve the compliance to the requirements of the Public Internetworking System (SPC) and, in particular, to the "service agreements" in the context of cooperation (SPCoop). The results of this activity will be extended to other kinds of agreements between public administrations for the exchange of spatial data.

The service agreements SPCoop represent one of the elements of the cooperation model in order to improve the interoperability and the exchange of data and services between Administrations and to provide end-user services.

The service agreement defines service performance and service delivery mode, the functionality of the service, the messages exchange interfaces, the quality and security requirements.

Through the software component of the Registry Services, the agreements are recorded. Through the registry services are made available the features for recording, accessing, researching, updating and deleting the service agreements.

The Public Internetworking System, within which there are the service agreements and registry services, is the model identified in Italy as "the set of organizational structures, technological infrastructures and technical rules for the development, the sharing, the integration of the information assets of public administration, necessary to ensure interoperability and cooperation of information systems and flows, ensuring the security and confidentiality of information"

Next to defining the technical rules for exchange of spatial data, the CTSGI In addition, the CTSGI participates in the definition of the rules and costs for the use of data between the central and local governments and by private providers. CTSGI, along with CNIPA, supports Public Authorities in order to define the agreements about the exchange of spatial data. As an example, in 2007 the CTSGI has participated in the definition of financing and technical rules for the use of cadastral data from the information systems of the other administrations (Art 59, paragraph 7-bis – Decree 82/2005) and for access to cadastral database (decree November 13th, 2007 available on the website of CNIPA at [http://www.cnipa.gov.it/site/it-IT/Attivit%
c3%a0/Sistemi_Informativi_Territoriali/
Specifiche_tecniche/Dati_catastali/](http://www.cnipa.gov.it/site/it-IT/Attivit%c3%a0/Sistemi_Informativi_Territoriali/Specifiche_tecniche/Dati_catastali/)).

In the meeting of March 4th 2008 the CTSGI (Comitato per le regole tecniche sui dati territoriali delle pubbliche amministrazioni – Committee for Technical Specifications on GI) decided:

- the CTSGI collects and updates every six months the information about data sets and services available in Italy;
- the CTSGI directly provides to Inspire information about the Italian situation;
- the CTSGI is the reference point for the coordination of activities related to implementation of the Inspire directive;

The Consulta Nazionale per l'informazione territoriale ed ambientale is the responsible organisation for the INSPIRE implementation and is chaired by a representative of the Ministry for Environment and with a maximum of 50 members.

The Members are: one representative of each of the National mapping agency, each region and autonomous provinces, Ministry for Defence, Ministry for education, university and research, Ministry for infrastructures and transportation, Ministry for agriculture, Ministry for cultural good and activities, Ministry for economic development, Ministry for health, Ministry for relations with regions, ISPRA (the national environmental agency), Department of civil protection, DIGITPA (the national agency for digital administration), Union of the Italian provinces(UPI), Union of Italian municipalities (ANCI).

Some Directorates of the Ministry of Environment have been active in complying with INSPIRE despite the absence of an Italian law. There have been a number of projects (DIVA project, Ambiente in Comune, <http://cart.ancitel.it/>, etc.) in which INSPIRE principles and rules have been applied in co-operation with ANCI (National Association of Municipalities) Some Regions have also been active in pushing their spatial infrastructures to comply with INSPIRE, also through the regional environmental agencies.

2.2.1 Conclusions of Component 1

The approach and territorial coverage of the SDI is truly national and a number of the SDI components have reached a significant level of operability. The Ministry for Environment chairs the Consulta Nazionale per l'informazione territoriale ed ambientale which is the responsible organisation for the INSPIRE implementation. Producers and users of spatial data are participating in the SDI. The composition of Consulta Nazionale per l'informazione territoriale ed ambientale involves members of the National mapping agency, each region and autonomous provinces, Ministry for Defence, etc.

Based on these conclusions we score the indicators as follows:

- The approach and territorial coverage of the SDI is truly national

- One or more components of the SDI have reached a significant level of operability (4)
- The officially recognised or de facto coordinating body of the SDI is a NDP, i.e. a NMA or a comparable organisation (No)
- The officially recognised or de facto coordinating body for the SDI is an organisation controlled by data users
- An organisation of the type ‘national GI-association’ is involved in the coordination of the SDI (No)
- Producers and users of spatial data are participating in the SDI
- Only public sector actors are participating in the SDI

2.3 Component 2: Legal framework and funding

2.3.1 Legal framework

The 1996 Intesa agreement (amended in 2000) was an important step in the development of the Italian NSDI. The agreement was signed by various ministries, the regions and some other local authorities with the objective to set-up the Italian NSDI, to increase the availability of geographic data and to stimulate harmonisation by the adoption of specifications. Partners in the agreement included the Ministry of Environment and Land Protection, the Ministry of Finance, the Ministry of Defence, the State Treasury, the Authority for IT in the Public Administration, the Regions, the provinces and the counties. (A. Annoni, Lessons learnt from Italian SDI, http://inspire.jrc.ec.europa.eu/reports/AANSIDI_Italy_FinalApproved_v12en.pdf).

The Italian e-government policy and legislation has also been important for the development of the NSDI. The decree creating the Codex for Digital Administration (“*Codice dell’Amministrazione Digitale*”) was adopted in 2005 and entered into force on 1 January 2006. It is a general decree on e-administration with articles specifically referring to GI. As was mentioned before, article 59 establishes the “*Comitato per le regole tecniche sui dati territoriali*” (Committee for technical specifications on GI) and the “*Repertorio Nazionale dei Dati Territoriali*” (National GI Repository). Next to its technical tasks, the Committee should also create rules on the sharing of spatial data at the national and the sub-national level.

In 2007, the Committee and the Agenzia del Territorio created technical and economic rules for the sharing of cadastral data between public bodies, compliant with article 59 of the Codex.

2.3.2 Public-private partnerships (PPPs)

The CTC manages to interact with private sector companies working in the data production sector. This is especially true for data production at regional and municipal level. At these levels, data production was traditionally carried out by private companies under technical coordination of the public authorities.

2.3.3 Policy and legislation on access to and re-use of public sector information (PSI)

There is a general law for cost-free access to PSI (Act no. 241 of 7 August 1990) that provides for general access to government documents, although access in many cases depends on the existence of a legal interest. The specific conditions for access are regulated by the ministry involved.

Directive 2003/4 on access to environmental information has been transposed into Italian legislation by Decreto Legislativo 19 agosto 2005, n. 195, "Attuazione della direttiva 2003/4/CE sull'accesso del pubblico all'informazione ambientale". Directive 2003/98 on the re-use of PSI has been implemented by the Act of 24 January 2006, n. 36, "Attuazione della direttiva 2003/98/ce relativa al riutilizzo di documenti nel settore pubblico". The Codex for Digital Administration (Codice dell'Amministrazione Digitale), previously mentioned, was then updated to be consistent with the implementation of the PSI Directive. The Codex foresees, in a generalized way, that any data managed by a public administration, with limited exceptions and whilst respecting personal data protection rules, can be accessed and re-used by any other public administration for the execution of their tasks, and this without any costs (excepted if "exceptional costs" may occur). However, the European Commission made a complaint against Italy by a letter of formal notice for not transposing the directive correctly. Early 2010, the Italian authorities announced changes to the law, in order to make it compliant with the directive. The law is currently under consideration by the Parliament.

The decree of the Director of the "Agenzia del Territorio" (decree November 13th, 2007 available on the website of CNIPA at URL [http://www.cnipa.gov.it/site/it-IT/Attivit%
c3%a0/Sistemi_Informativi_Territoriali/Specifiche_tecniche/Dati_catastali/](http://www.cnipa.gov.it/site/it-IT/Attivit%c3%a0/Sistemi_Informativi_Territoriali/Specifiche_tecniche/Dati_catastali/))

states that the cadastral database, including administrative, cadastral, graphic and map information related to all cadastral parcels, are made available to Public Administrations. The decree defines the way Public Administrations can use cadastral data in accordance with the laws on privacy and on the re-use of data and cadastral information. Access to cadastral data is free of charge, except for exceptional costs if any related to the implementation and supply of special services related to special needs.

2.3.4 Legal protection of GI by intellectual property rights

The Italian Copyright Act of 1941 has been amended several times throughout the years. The Database Directive 96/9/EC was implemented into Italian law by Decree no. 169 of

6 May 1999. Legislative Decree No. 68 of 9 April 2003 has implemented Community Directive No. 2001/29 on the harmonization of certain aspects of copyright and related rights in the information society. The Decree came into force on 29 April 2003.

No copyright exists in the texts of official acts of the state or public administrations (e.g. laws and judicial decisions). The State and local government can however be copyright owners of works created and published under their name, account and at their expense. But it only enjoys a 20-year period of protection on its own creations. The state may of course renounce the right to royalties if it wishes to assure maximum public access.

Photographs that are original are subject to normal copyright. All other photographs are covered by article 88 of the Copyright Act. The photographer has the exclusive right to reproduce, publish and sell the photographs taken by him or her. The exploitation right on non-original photographs lasts twenty years after production.

2.3.5 Restricted access to GI further to the legal protection of privacy

The Italian Data Protection Act of 1993 was updated by Act no. 675 of 31 December 1996 (*Tutela delle persone e di altri soggetti rispetto al trattamento dei dati personali*) to comply with European Directive 95/46/EC. This Act entered into force on 8 May 1997. Italy has transposed Directive 2002/58 on privacy and electronic communications in 2003.

2.3.6 Licensing framework

No information has been found nor provided.

2.3.7 Funding model for SDI and pricing policy

National funding stems from the Treasury, the Ministry of Environment and Land Protection and some European funds for 'Objective 1 regions'. The initiative is now also framed within the e-government policies coordinated by the new Ministry for Technological Innovation. Cost recovery exists, but is only a minor source of financing.

The Istituto Geografico Militare sells maps online and provides online access to data, A complete catalogue of products, the conditions of use, and the conditions for becoming a reseller are available on http://www.igmi.org/vendite/condizioni_vendita.php.

Every cartographic institution is currently ruled under a specific normative system and the distribution of the data only happens under payment both for public administrations and for the private sector. Amongst public administrations participating in the agreement of the year 2000 the data are however exchanged without any fees, while those outside the agreement are encouraged to participate by publishing their own data, in exchange for access to existing databases. Citizens and the private sector are allowed free access for consultation (viewing) but not for downloading.

Regions are collecting their data mainly with their own resources and some of them made accessible those both through the Italian Portal and providing direct access. Some regions are giving free access to the data whereas other are still requiring some cost recovery.

2.3.8 Conclusions of Component 2

The final text on INSPIRE transposition has been published. No changes on the PPP initiatives have been found. There is a general law for cost-free access to PSI (Act no. 241 of 7 August 1990) that provides for general access to government documents, although access in many cases depends on the existence of a legal interest. It is unlikely that private companies will be permitted access if their interest relates to the commercial exploitation of information. The specific conditions for access are regulated by the ministry involved. Access to cadastral data is free of charge, except for exceptional costs if any related to the implementation and supply of special services related to special needs. National funding stems from the Treasury, the Ministry of Environment and Land Protection and some European funds.

Based on these conclusions we score the indicators as follows:

- There is a legal instrument or framework determining the SDI-strategy or – development
- There are true PPP's or other co-financing mechanisms between public and private sector bodies with respect to the development and operation of the SDI-related projects (No)
- There is a freedom of information (FOI) act which contains specific FOI legislation for the GI-sector (No)
- GI can specifically be protected by copyright (No Information found)
- Privacy laws are actively being taken into account by the holders of GI (No Information found)
- There is a framework or policy for sharing GI between public institutions
- There are simplified and standardised licences for personal use (No Information found)
- The long-term financial security of the SDI-initiative is secured (Partially)
- There is a pricing framework for trading, using and/or commercialising GI (No)

2.4 Component 3: Data for themes of the INSPIRE annexes

2.4.1 Scale and resolution: European, National, Regional, Local, Other

Production of (digital) topographic maps and derived products at scales 1:25.000 and smaller is the mandate of IGM. The most up-to-date product is the 1:50.000 map series and database. Temporal heterogeneity of the map sheets is large.

Topographic (Technical) and derived maps at scales 1:10.000 and 1:5000 are produced under the authority of regions, provinces, counties and municipalities.

Cadastral maps are at scale 1:2.000 to 1:1.000 and are produced by the local authorities with a strong coordinating role for the Agenzia del Territorio, the new Cadastral Agency.

2.4.2 Data by resolution or scale range for the INSPIRE themes

As a consequence of the *Intesa*, geodatasets produced at various levels are now being harmonized while new data are produced increasingly according to common technical specifications enabling operational seamless integration.

Currently there are several digital spatial databases at different scale levels coming from different partners (at different levels) of the NSDI:

- A database with fundamental reference layers at scale 1:10.000. Vectorial layers include the administrative boundaries, hydrological grid and watersheds, railways and road network, urban centres and residential areas. In addition a gazetteer is available for the whole territory. The objective is to have the whole territory at this scale by 2006;
- Large scale maps in digital form will be available for around 10% of the territory at scales between 1:1.000 and 1:2.000, covering the main population centres. As is the case for the 1:10.000 database, basic layers are integrated including the road and river network, the geodetic framework and the administrative boundaries;
- Since 1986, a program was set up to digitize the cadastral map sheets (310.000). By 1993, 27% was done and since then the work proceeded (the exact figures of the status were not found in the literature) progressively, including some local surveys from which the digital information is included in the system;
- A Digital terrain Model (implemented using TIN data model derived from topographic digital maps 1:10.000 – 1:2.000);
- A geodetic network of reference points of the IGM. The IGM is also responsible for the 1:25.000 and 1:50.000 topographic maps and the small scales;

- Raster topographic maps at scale 1:10.000, 1:25.000 and 1:100.000;
- Orthoimagery, B/W as well as colour at scale 1:10.000 and at scale 1:2.000 for the most important cities. Aerial photo's and satellite are available exist as well;
- The National Statistical Institute (ISTAT) provides a lot of social-economic data at municipal level (including population figures), up-to the census track level (infra-communal).

Depending on the region, also other databases (and/or maps) are available. In the region of Emilia-Romagna for example, there are datasets available on geology, soil, land-use and land-cover, etc.

The information layers advertised by the National Digital Mapping Portal in Spring 2003 are:

Information layer: **Gray tones Digital orthophoto**
Features: 256 gray tones / 8 bit
 resolution 1 meter per Pixel
Coverage: National
Utilization:

Digital orthophotos allow a direct territorial representation as it allows the user an immediate and realistic visualisation of the territory. Due to the complexity and detail this data can be used as cartographic reference base for the control and updating of the vectorial information layers: road network, forests. Coastal lines, etc. Furthermore the possibility of immediate representation of the territory makes this data very useful as cartographic base for the visualisation of thematic maps. Digital orthophotos provide information about the real status of territory when filmed by airplane. The comparison between Digital orthophotos, filmed at different times, is useful for the analysis of geomorphology and evolution of human settlements.

Information layer: **Colour Digital orthophoto**
Features: 16 million colours / 24 bit;
 resolution 1 meter per Pixel
Coverage: National
Utilization:

Same as Gray tones Digital orthophoto.

Information layer: **Regular Grid Digital Terrain Model**
Features: Step 20 meters
Coverage: National
Utilization:

The three-dimensional numeric representation of the surface allows the complete altimetry characterisation of the territory as well as a detailed morphological description.

The digital model of the terrain is useful for territorial analysis where the height of the terrain, or its derived representation such as clivometrics, is very important information to be acquired. This information is the basis for studies on the valuation of hydrological risk, environmental impacts, etc.

Information layer: **Administrative Data and Boundaries**

Features: Up to the census sections

Coverage: National

Utilization:

The administrative limits surround the territorial area of various government bodies such as: Regions, Provinces, Communes, Coastal authorities, Mountain Communes, etc.

The statistical data associated to such areas, derived from population and industrial censuses, allow carrying out demographic, socio-economic, territorial vulnerability studies.

Information layer **Toponomastic**

Features: Toponyms derived by IGM maps 1:25000 organized in databases and vectorial entities

Coverage: National

Utilization:

The toponomastic information contributes, in an essential manner, to the synthetic representation of the territory, as it provides information on names of places or other cartographic elements enabling their immediate identification.

The structure of the information layer furthermore allows the search and identification of areas, places or single elements on the basis of their name and not of their geographical position.

Information layer: **Coastal and Lakes Line**

Features: Digital Orthophoto

Coverage: National

Utilization:

Shoreline is useful for change detection analysis and erosion risk analysis.

Information layer: **Digital IGM Paper-based Cartography 1:25.000**

Features: 256 colours / 8 bit;
resolution 2.5 meters per pixel

Coverage: National

Utilization:

Traditional IGM cartography implemented as a continuous information layer of all the national territory, thereby giving a synthetic representation of the essential topographic character of the territory. The use of cartographic symbols allow the identification of specificities connected to the territory or to the infrastructure that are not easily identifiable from the orthophotos found in the underground as well as supplying quantitative and descriptive information such as altitude, etc.

Information layer: **Digital IGM Paper-based Cartography 1:100.000, 1:250.000, 1:500.000**

Features: 256 colours / 8 bit;
 resolution 10, 25, 50 meters per pixel

Coverage: National

Utilization:

The broad vision allowed by traditional cartography allow for the immediate identification of very important territorial information. The synthetic representation of the territory from such cartography is therefore adequate for the analysis and visualisation of the information layer at regional or national scale.

Information layer: **Digital Vector Terrain Model (TIN)**

Features: Derived by CTR data or IGM 1:25000

Coverage: 7 regions (National)

Utilization:

The digital model of the terrain, in triangular and irregular mesh network allows, in comparison to the regular network, a visualisation of the terrestrial surface in greater detail.

This is especially true for those terrains which have a great deal of morphological irregularity. High positional accuracy of these models makes them useful for detailed analysis like hydraulic hazard analysis, intervisibility analysis, RF impact maps, etc.

Information layer: **Street network**

Features: Vectorial graph adapted to the orthophoto

Coverage: National

Utilization:

The road network, improved in location precision through orthophotos head up digitizing and structured in a vectorial network GIS layer, allows carrying out studies on territorial viability, optimization of the routes to take in case of natural disasters for civil protection, as well as studies on the vulnerability of the infrastructure.

Information layer: **Three-dimensional Vector Model of buildings**

Features: High resolution urban maps, provided with base quote, roof quote, and building civic numbers.

Coverage: Provincial and Regional main cities

Utilization:

The vectorial detailed information of the main urban centres allows for a precise modelling of the constructed areas. On the basis of this information it is possible to conduct detailed urban studies. From this information it is also possible to derive the volume of buildings and generate high precision localisation digital terrain models.

Regarding the three INSPIRE annexes addressing the 34 spatial data themes, Italy is providing discovery and view services for some of them while a number of them can be also downloaded. A complete list will be presented in the updated report including the information provided by the country in 2010. The next tables give an overview of the organisations/stakeholders providing data sets covering the 34 themes of the INSPIRE annexes.

AdT	Agenzia del Territorio
AGEA	Agenzia per le Erogazioni in Agricoltura
AIMA	Azienda di Stato per gli interventi nel Mercato Agricolo
APAT	Agenzia per la Protezione dell' Ambiente e per i servizi Tecnici
CIGA	Centro Informazioni Geotopografiche Aeronautiche
CFS	Corpo Forestale dello Stato
CISIS	Centro Interregionale per i Sistemi Informatici Geografici e Statistici
CNR	Consiglio Nazionale delle Ricerche
Comuni	Riferimento ai Comuni d'Italia
COTIR – Abruzzo	Consorzio per la sperimentazione e la divulgazione delle Tecniche Irrigue - Abruzzo
DPC	Dipartimento della Protezione Civile
IGM	Istituto Geografico Militare
IIM	Istituto Idrografico della Marina Militare
INEA	Istituto Nazionale di Economia Agraria
INGV	Istituto Nazionale di Geofisica e Vulcanologia
ISTAT	Istituto Nazionale di Statistica
MATTM	Ministero dell' Ambiente e della Tutela del Territorio e del Mare
MBAC	Ministero per i Beni e le Attività Culturali
MIPAAF	Ministero delle Politiche Agricole Alimentari e Forestali
Regioni	Riferimento alle Regioni italiane e alle province autonome di Trento e Bolzano

2.4.3 Geodetic reference systems and projections

One reference system is used as the Geodetic Reference Cartographic System: UTM, zones 32 and 33 with WGS 84 as the geodetic datum. There exist some conversion algorithms to transfer data from former systems of the IGM into the new reference system. In this respect Roma40 and ED50 (INTESA) are mentioned. Cadastral data are still available in Gauss Boaga or local systems (with local projection centres).

For presentation purposes the Gauss Boaga projection system is sometimes used.

The spatial characteristics of the objects on the topographic maps are described in detail (“INTESA/WG01, Specifiche per la realizzazione dei Data Base Topografici di interesse generale). Some of the INTESA documents adopted draft versions of the ISO standards (when available) but they are not 100% compliant.

2.4.4 Quality of the data

No information is available on the quality of the data as such.

Particular attention is now given to “quality” issues. INTESA is looking to prepare common technical specifications (“capitolato tecnico”) to be adopted by all Public authorities in their call for tender to collect data of comparable quality. Some Regions already adopted and used such common technical specifications for recent tenders. On the INTESA website, it is described that all aspects of quality assessment should be envisaged: meta-information, precision, completeness, ... However, there seems not to be a fixed procedure.

2.4.5 Interoperability

A lot of attention is devoted to the elaboration of common technical specifications for spatial data production so that geodatasets from various producers can be harmonized and standardized. Current technical specifications, mainly inspired by ISO 19111 and OpenGIS standards pertain to:

- The database of fundamental reference layers at scale 1:10.000;
- Digital Terrain Model;
- The fundamental geodetic network IGM95;
- The topographic database of general interest.

It is clear however, that in a lot of cases ESRI public format shape file or Autodesk .DWG file format are used for data exchange.

For data transfer, INTESA refers to XML and GML protocols.

Moreover, new projects provide such interoperability options (e.g. The Map server of PODIS project has the ability to integrate local data on "the-fly" (from files and / or geographic RDBMS) with remote data obtained from a server-compatible with standard WMS thus obtaining the full data interoperability.

2.4.6 Language and culture

Most of the information encountered was in the Italian language however most of the sites are incorporating English and other language versions (e.g. the national geoportal

<http://www.pcn.minambiente.it/PCN/index.php?lan=en> and the site of the Sud Tyrol (<http://www.provincia.bz.it/>).

2.4.7 Data Content

There exists a detailed data objects catalogue in Italian.

2.4.8 Geographical names

Official geographical names derived from IGM maps 1:25.000 are organized in databases. Vectorial entities are available with a National Coverage.

The structure of the information layer allows the search and identification of areas, places or single elements on the basis of their name and not of their geographical position.

2.4.9 Character sets

No information has been found.

2.4.10 Conclusions of Component 3

Already from the previous IT's SoP report Geodatasets existed which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components while the geodetic reference system and projection systems are standardised, documented and interconvertable. There are 129 unique data sets for the different themes in the annexes of INSPIRE from 29 stakeholders. Particular attention is now given to "quality" issues however there is not yet established a fixed procedure. Moreover, new projects provide such interoperability options (e.g. The Map server of PODIS project has the ability to integrate local data on "the-fly" (from files and / or geographic RDBMS) with remote data obtained from a server-compatible with standard WMS thus obtaining the full data interoperability. More websites provide now information documents in English. However still the portal / map services search options remain in Italian.

Based on these conclusions we score the indicators as follows:

- Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components
- The geodetic reference system and projection systems are standardised, documented and interconvertable
- There is a documented data quality control procedure applied at the level of the SDI (No)

- Concern for interoperability goes beyond conversion between different data formats
- The national language is the operational language of the SDI
- English is used as secondary language (No)

2.5 Component 4: Metadata

2.5.1 Availability

The objective is to produce metadata for all the datasets: discovery, exploitation, as well as exploration metadata. In reality, existing datasets are described in a variable way. In some cases metadata are missing, sometimes the metadata are poor, in other cases they are well developed.

In the case of the Emilia-Romagna region, following metadata could be found for (part of) the datasets described: availability, adjournment and edition of the dataset; scale, year of data, year of editing, territorial coverage, methodology for realizing the dataset, technical details, notes.

2.5.2 Metadata catalogues availability + standard

The National Mapping Portal implements “core” specification of ISO TC 211 ISO/DIS 19115 standard metadata. Also the Coordination Center of Regions (Centro Interregionale di Coordinamento e Documentazione per le Informazioni Territoriali) uses a metadata model derived from ISO TC 211 ISO/DIS 19115 standard metadata.

On the website of CNIPA, at [http://www.cnipa.gov.it/site/it-IT/Aree operative/Progetti, applicazioni e servizi/Sistemi Informativi Territoriali /Repertorio Nazionale dei Dati Territoriali/](http://www.cnipa.gov.it/site/it-IT/Aree_operative/Progetti_applicazioni_e_servizi/Sistemi_Informativi_Territoriali_/Repertorio_Nazionale_dei_Dati_Territoriali/), guidelines for the implementation of the ISO Standard 19115 (version 0.3) and XSD schemas for the exchange and validation of metadata XML files are available.

Via the Ambiente in Comune Geonetwork (<http://cart.ancitel.it/catalogometadati/srv/en/main.home>) user are provided with access of metadata to 824 different datasets.

Metadata on other geodatasets available at various institutions are catalogued to various extents. No information could be found whether, and if yes which, standards are applied.

The National Geospatial Metadata Catalogue (RNNDT) is a component of a wider organization ranging from an infrastructure for data sharing to the requirements for the production of new data (Figure 1). It will be a free metadata searching tool by which it will be possible to receive country-wide information on the availability of datasets and web services, on the conditions applied to their access and use and on the terms to obtain data. The Committee for Technical Rules, while setting up the National Spatial Metadata Catalogue, has also defined a national metadata schema to facilitate spatial data access and sharing. At the moment, two draft annexes have been provided:

Annex I is a draft list of public interest spatial information;

Annex II deals with specification about National Spatial Metadata Catalogue's creation and feeding.

Therefore, DSA decided to develop a software package, called *OpenGIADA*, *Geographic Information And Database Administration*, an integrated system for producing, managing and updating datasets and metadata at the same time. It is connected with an Office suite that manages texts, document register, addresses and folders, with a unique logical approach for the user.

OpenGIADA consists of four tools:

- *Media Management*: creation and filing of metadata associated to spatial data storage devices.
- *Spatial Data Management*: spatial information cataloguing and creation of metadata according to ISO/TC 211 19115 "Core Metadata Elements". Metadata can be exchanged by the use of XML format. A search engine enables the user to retrieve all the catalogued information.
- *Spatial Datasets Management*: combination of several different datasets into single "Projects" and creation of project metadata.
- *GIS for Visualization and Editing*: light and easy-to-use tool to perform powerful operations such as quick visualization of huge amount of data, creation of new datasets, editing, spatial analysis, report from attribute tables.

OpenGIADA also exports metadata in XML format that, if required, could be part of the INSPIRE Catalogue or of the National Catalogue, as well as any other standard metadata catalogue. (Pasca et al., 2009)

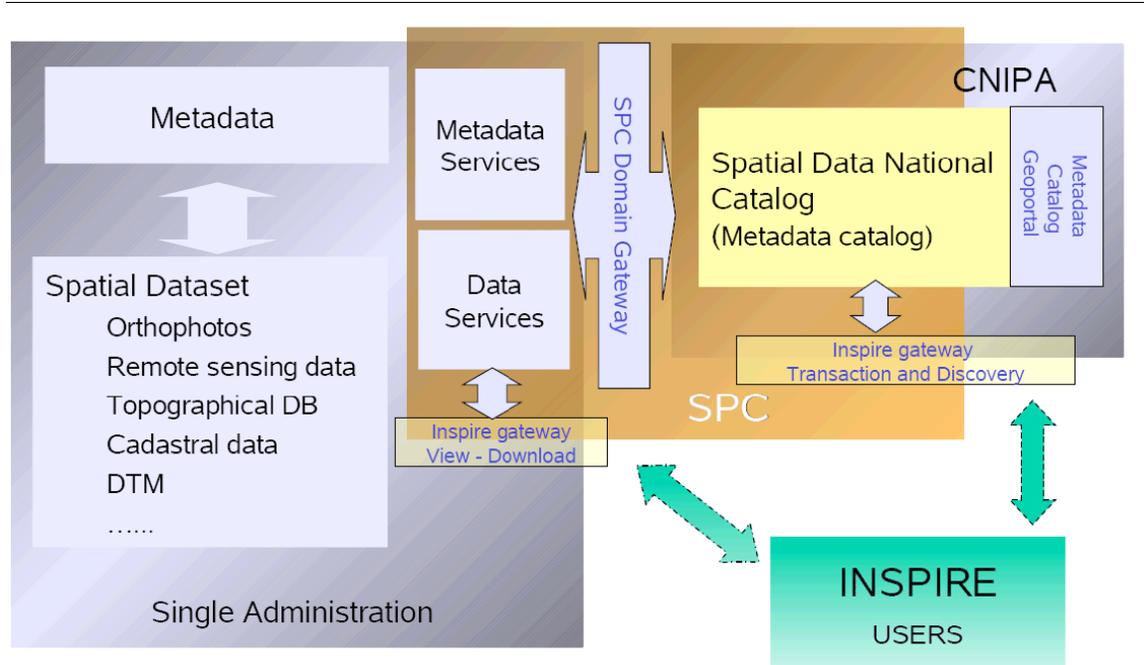


Figure 1. Metadata Catalogue

2.5.3 Dublin core metadata standards for GI-discovery

No information has been found nor provided.

2.5.4 Metadata implementation

The Ministry of Environment and Land Protection is co-ordinating the metadata efforts for *Intesa*. Partners are responsible for gathering the necessary information. An important role is played by the Centro Interregionale who developed a first prototype publishing data available in Italian Regions <http://www.centrointerregionale-gis.it/>.

2.5.5 Conclusions of Component 4

Metadata are produced for a significant fraction of geodatasets of the themes of the INSPIRE annexes. With The National Cartographic Portal and the new regional activities the metadata production has increased. The National Geospatial Metadata Catalogue (RNMT) is a component of a wider organization ranging from an infrastructure for data sharing to the requirements for the production of new data.

Based on these conclusions we score the indicators as follows:

- Metadata are produced for a significant fraction of geodatasets of the themes of the INSPIRE annexes

- One or more standardised metadata catalogues are available covering more than one data producing agency
- There is a coordinating authority for metadata implementation at the level of the SDI

2.6 Component 5: Network Services

There is a national geoportal ‘Portale Cartografico Nazionale’ (<http://www.pcn.minambiente.it/PCN/>) that will become also the INSPIRE national geoportal. At the moment it is addressing information provided partly from the Ministry of Environment and some public administrations (e.g. Water Districts.) but it will be the point of access for the metadata catalogue, network services, and of the environmental information system. The system will address the broader NSDI that will include also datasets not required by INSPIRE (e.g. for different scales). Currently around 69 datasets are discovered in the geoportal and 50 of which can be used with WMS, WFS or WCS.

2.6.1 On-line access service for metadata: discovery services

The national on-line access service for meta-data, operated by the Ministry of Environment and Land Protection within the SRC via a central focal point on the web was the National Mapping Portal (www.atlanteitaliano.it) now integrated to the national geoportal (<http://www.pcn.minambiente.it/PCN/>).

Generally speaking, several services exist at national and regional level providing discovery services, but their coverage is variable. Access to metadata is provided via the Internet protocol in the Italian language.

Some strong examples of regional initiatives are the services provided by (1) the Emilia-Romagna Region (www.regione.emilia-romagna.it/), based on the ArcIMS as software – and (2) the Alto-Adige Region <http://www.provincia.bz.it/english/default.htm>.

Moreover, the region of Sardinia (SITR-IDT) has developed a regional portal that includes standard services for geographical data access and publication.

There are two main groups of services in SITR-IDT:

- **application services**, having the specific capability of connecting the data to the applications using it (usually on the WEB). Specifically, this service grants the geographical data publications by mean of web services (WMS, WFS) and the relative metadata through the catalogue services (Metadata Catalogue ISO19115 and Feature Catalogue ISO 19110).
- **applications**, i.e. services with a human interface directly accessible through the Regione Sardegna Geoportal – www.sardegнатerritorio.it .

Throughout the Regione Sardegna Geoportal the following services are accessible:

1. View service: several simple and advanced cartographic navigators are available, that display basic cartography, such as aerial photographs, orthophotos, topographic databases, thematic maps. The OGC WMS services are also available, for map visualisation.

2. download service: when storing the dataset in the DB Unico through the ETL procedure, the data are compressed and archived in the file system. The compressed data can be retrieved from the system through a download service via web. Besides, an OGC WFS (Web Feature Service) is available, allowing a client to retrieve geospatial data.

3. transformation service: an important service for map reprojection of data in .GML and .SHP format, based on the IGM (Istituto Geografico Militare) grids including the most commonly used Italian and European geographical systems. The OGC WFS service applies an on the fly geographical system transformation to the data when locally downloading them.

4. discovery service: this service allows the metadata publication on the Internet forming the Catalogue of the Regional geographical data. It uses different modality for the searching (spatial, key words, data owner, date of data creation, ISO category, etc.) and gives the possibility to search the metadata datasets according to the ISO19115 and to download the related xml. (<http://www.cadcorp.com/pdf/PPT-inspire%20paper.pdf>).

Furthermore, INSPIRE web services have been implemented and are freely accessible from the website:

Navigation:

Several cartographic navigators in 2 or 3 dimensions have been created, customized according to the different possible users; they are accessible from the page <http://www.sardegнатerritorio.it/j/v/275?s=6&v=9&c=1937&na=1&n=6&b=1> .

Download:

a service to make available all geographic data by direct download will be soon made available on the web site;

Conversion:

a web application for converting data between different reference will be soon published on the web site; a work-in-progress version is at the moment accessible at http://webgis.regione.sardegna.it/raswebconverter/index?stato_quale=punto and http://webgis.regione.sardegna.it/raswebconverter/index?stato_quale=file;

Catalogue:

a Regional Catalogue of all geographic data of the Region, fed with metadata of all territorial data, has been created. It is available at <http://webgis.regione.sardegna.it/catalogodati/ricercaavanzata> and it allows searching for

all the geographic data published by the Region of Sardinia. Its search criteria partially comply with the INSPIRE directive.

All geographic data present in the database are also accessible through the interoperability OGC services WMS (Web Map Service) and *WFS* (Web Feature Service). They allow viewing and downloading data of the SITR-IDT database by using a GIS client desktop or a WEB GIS application compliant to the OGC international standard.

The links for operating the interoperability connection are available at <http://www.sardegнатerritorio.it/j/v/239?s=6&v=9&c=2871&na=1&n=10>.

The following table gives an overview of the available services.

Service ²	Organisation responsible	Type of service ³	Metadata (N/Y/ISO) ⁴	Open for Public (Y/N)	Free/N of free ⁵ (Y/N)
http://sgi.isprambiente.it/geoportal/catalog/main/home.page http://sgi.isprambiente.it/geoportal/catalog/content/wm.service.page	APAT - Servizio Geologico	View	ISO	Y	Y
http://www.nsd.it (Reserved Geospatial Data Portal) http://wms.nsd.it (WMS Services) http://wfs.nsd.it (WFS Services) http://wcs.nsd.it (WCS Services) http://csw.nsd.it (Catalogue Services)	Prime Minister's Office Civil Protection Dept. Technical Delivery : National Council of Research - IMAA	1. discover 2. view 3. download 4. invoking services	Y	N	N
http://gisst.eu/cgi-bin/wms_serv?&SERVICE=WMS&REQUEST=GetCapabilities	Parco Nazionale della Majella (progetto GRISI)	2.view	ISO		
http://cartanet.regione.abruzzo.it/wmsconnector/com.esri.wms.Esrimap?request=getcapabilities&service=WMS&version=1.1.1 (46 services)	Regione Abruzzo	2.view	Y	Y	Y
http://gpsnet.regione.abruzzo.it/ (servizio Stazione Virtuale GPS) (servizio di download dati stazioni fisse GPS)	Regione Abruzzo	3.download	Y	Y	Y
http://www.regione.abruzzo.it/portale/index.asp (servizio di Consultazione Rete Geodetica)	Regione Abruzzo	1.discover 3.download	Y	Y	Y

² List the names/IDs and where possible the link (URL) of all the discover, view, download, transformation and invoking services that are part of your infrastructure

³ Indicate the type (discover, view, download, transformation and invoking services)

⁴ Indicate whether the service has no metadata (N), or metadata according to ISO 19119 (ISO).

⁵ Whether or not the service is free for use.

http://www.regione.abruzzo.it/xcartografia/	Regione Abruzzo (progetto GRISI)	2.view	ISO	Y	Y
http://pr5sit.regione.calabria.it/web/pr5sit/home.jsessionid=50CCFA25997DE3FE8472A9E477293B3E http://www.regione.abruzzo.it/xcartografia/index.asp?mollo=wms&servizio=xList&stileDiv=mono&template=default&msv=webmapse	Regione Calabria Dipartimento Urbanistica e Governo del Territorio - Centro Cartografico Regionale	1. discover 2. view 3. download 4. invoking services	Y	Y (except WFS Services)	Y (only WMS Service)
http://www.regione.emilia-romagna.it/sigeografici/testi/car_esc/pres_esc.htm (Web GIS cartografia escursionistica)	Regione Emilia	2.view		Y	Y
http://www.urbanisticaecasa.regione.lazio.it/cartografia_on_line/www/ric.asp?cat=1	Regione Lazio	2.view		Y	Y
http://www.cartografiarl.regione.liguria.it/CartoWebNet/CwMappa.aspx?codice_applicazione=1	Regione Liguria	2.view		Y	Y
http://www.cartografia.regione.lombardia.it/carto1.asp?idCart=1&idSez=33&idCat=49&idcnet1=333	Regione Lombardia	1. discover 2. view 3. download 4. Gazetteer		Y	Y
http://www.gpslombardia.it/ (servizio Stazione Virtuale GPS) (servizio di download dati stazioni fisse GPS)	Regione Lombardia IREALP	3.download		Y	N
http://151.99.174.16/ctr/index.html	Regione Molise	2.view		Y	Y
http://www.sistemapiemonte.it/wmscont/com.esri.wsit.WMSServlet/CTR_limiti_amministrativi?VERSION=1.1.1&REQUEST=GetCapabilities (WMS service - example) http://www.sistemapiemonte.it/serviziositad/ (Metadata Catalogne - SITAD)	Regione Piemonte	1. discover 2. view 3. download 4. invoking services	Y	Y	Y

http://www.regione.piemonte.it/geopiemonte/ (Geographical Web Site Regione Piemonte)					
http://www.cartografico.puglia.it/cartomdb/	Regione Puglia	2.view		Y	Y
http://webgis.regione.sardegna.it/wmsconnector/com.esri.wms.Esrimap/ras_wms?request=getcapabilities&service=WMS&version=1.1.1	Regione Sardegna (SITR)	2.view			
http://webgis.regione.sardegna.it/geoserver/wfs?service=WFS&request=GetCapabilities	Regione Sardegna	3.download			
http://web.rete.toscana.it/sgrwms/com.rt.wms.RTmap?servicename=rt_wms&version=1.1.0&service=WMS&Request=GetCapabilities	Regione Toscana (GeoScopio 1)	2.view			
http://web.rete.toscana.it/sgrwms/com.rt.wms.RTmap?servicename=rt_wms_cartografia&version=1.1.0&service=WMS&Request=GetCapabilities	Regione Toscana (GeoScopio 2)	2.view			
http://www.umbriaterritorio.it/scripts/sisterims.dll?Run?svr=server21&Func=open&map="Mappa%20di%20Ricerca"&html (CTRonWeb) http://www.umbriaterritorio.it/ArchieOnWeb/sceltazi.asp (ArchieOnWeb - archivio fotogrammetrico)	Regione Umbria	2.view		Y	Y
http://labtopo.ing.unipg.it/labtopo/index.php (Servizio Stazioni Permanenti GPS)	Regione Umbria Univ. Perugia	3.download			
http://cartografico.regione.veneto.it/wpcartograficoveneto/framesetup.asp	Regione Veneto	3.download			
www.provincia.bz.it/urbanistica/cartografia/download-cartografia.asp	Provincia Autonoma di Bolzano	Download	Y	Y	Y
http://sit.provincia.lodi.it/ctr.asp	Provincia di Lodi	2.view			

http://www.irdat.regione.fvg.it/Consultatore	Regione autonoma Friuli Venezia Giulia	1. discover 2. view 3. download	ISO	Y	Y
http://cartografia.regione.marche.it	Regione Marche	view		Y	Y
www.cartografia.regione.liguria.it WMS Services (n. 350 services)	Regione Liguria	1,2	Y	Y	Y

2.6.2 On-line access service for data: download services

A major project is the development of a single portal for reference data that should become the core of the NSDI. This service is being developed by the Ministry of Environment and Land Protection and is available online (<http://www.pcn.minambiente.it/PCN/>).

At the moment amongst the strata of maps available at (<http://www.pcn.minambiente.it>) all of which can be superimposed, users can find:

- Black and white and colour photo;
- IGM cartography;
- Digital model of landscape;
- toponyms;
- Administrative limits;
- Protected areas;
- Soil description;
- Plan of territory;
- Sea bathymetric;
- Coastal erosion risk;
- Physical map of coast;
- railways;
- Orthophoto dates;
- Geologic data;
- CORINE Land Cover.

During the last years, the Italian Ministry of Environment, in collaboration with ANCI, the National Association of Local Municipalities, has set up a system of projects, among which the one called “Ambiente in Comune” that provides both a national catalogue with spatial datasets and services, and a view service, including WMS and WFS tools, tested with INSPIRE geoportal. All services have been designed according to the international OpenGis standards. The Ambiente in Comune map services (<http://cart.ancitel.it>) have already been used by DIVA project in order to publish some applications that have been developed in order to test the validity of the support to environmental procedure. In particular a deep analysis has been performed in support to an IPPC procedure in the area of Taranto and the cartographic projects are published on the web. The datasets used in these analyses are shared through the Metadata Catalogue (<http://cart.ancitel.it/catalogometadati>) and different web service as WMS and WFS as well as visualization in Google earth. (Pasca et al., 2009).

Furthermore, SILOS, is a web portal for data publishing and sharing of document and databases. Also in the case of documents, metadata (following Dublin Core) are included, in order to facilitate search and evaluation of available documents.

2.6.3 Inter-linkages of on-line access services for metadata and data

In the National Mapping Portal simple use (browsing, viewing, basic query) of the data is possible within the same system. It is not clear whether download of data is possible.

2.6.4 OpenSource software for access services

The Ministry of Environment and Land Protection seems interested to migrate in the future the current system based on proprietary components toward an OpenSource software application.

The CCS is a technological infrastructure supporting the efficient exchange of geospatial, territorial and environmental metadata, characterized by a central entity, the National cartographic Portal (PNC), which collects all the metadata and peripheral entities to cooperation. Within the many projects, CCS (http://www.pcn.minambiente.it/pcn/progetto_scc.php?lan=en) has made several software applications on Open Source technology.

The software developed are:

- WEBGIS are a series of modules to visualize on the web data, management and publishing services, according to the OGC (MapServer + PHP).
- MetadataManager complete of any function for preparation and submission, according to the specifications of the envelope CNIPA e-government (Postgres + PHP).
- AdbToolBox (DeskTop GIS).

Adb Toolbox is a graphical application that can be used to display and process spatial datasets. The application, along with the typical features of Geographic Informative Systems, makes available specific functionality, including:

- subsystem "hydrological analysis "(HA) for the construction of hydrological analysis (hydrograph calculation of project);
- subsystem topographic quantitative analysis "(TQA) to realize some analysis of the geometry of river sections;
- subsystem "FIST" for defining, updating and technical and administrative management of framework needs for interventions aimed at territory security.

2.6.5 Availability of viewing service(s)

The same service as mentioned above provides access to the data itself. A user can perform an alphanumeric or geographical search of an area (search for the country, the region, the province, ..., municipality) or a search using geographic names, e.g. "Colosseo". The results of the search are listed (e.g. list of communes) while the selected area is visualized. In the next step one can visualize the information for the selected area. Layers can be mapped for the extent of the selected municipalities, e.g. The user can even go further and visualize particular parts of a layer according to certain criteria. Functions that are available are: pan and zoom, hot-linking with other information, spatial query, requesting information from the descriptive database(s), printing the view of the screen.

For registered users also use of the raster images in CAD/GIS products by means of the *url* is available.

In the near future layers will be available as web mapping services according to OpenGIS web mapping interfaces standards.

An example of viewing service is the PODIS project. PODIS project is conducted by the Soil Protection Direction - Ministry for the Environment, Land and Sea providing relevant GI data. The interesting aspect of this project lies in the MapServer ability to integrate local data on "the-fly" (from files and / or geographic RDBMS) with remote data obtained from a server-compatible with standard WMS thus obtaining the full data interoperability.

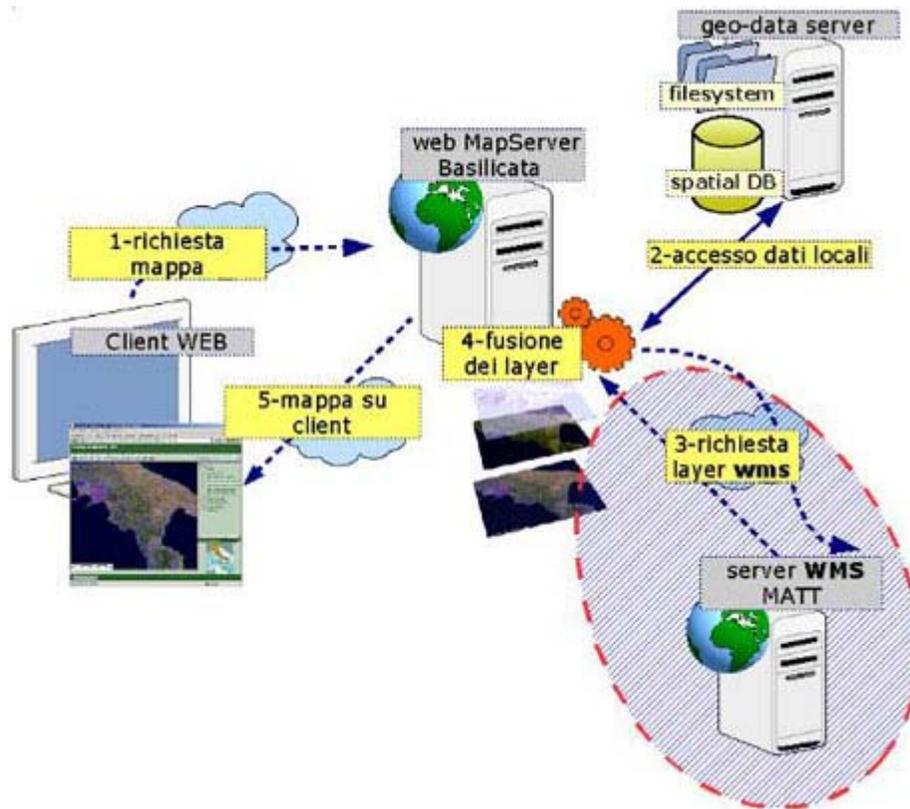


Figure 2. POCIS system overview

- **Map request:** the user sends the request to the remote MapServer through the web interface (in the example the server to the Basilicata Region).
- **Access to local data:** the MapServer of the Basilicata region collects the local data from typical storage systems for geographic data (file system and / or geographic RDBMS).
- **WMS layer request:** the MapServer of the Basilicata region requires to a remote server (in the example the central server to the METS) one or more geographical layers using the WMS protocol standardized by the Open Geospatial Consortium and by ISO.
- **Layers fusion:** The MapServer integrates the collected data (local and remote) and produces the final map
- **Map on the user:** The web user receives the map.

2.6.6 Availability of catalogue services to regulate access

There are several types of users according to security policies profiles to regulate access to data in the Federated Network. Some information layers are classified for broad public use. Others can be accessed by administrative users only.

2.6.7 Availability of catalogue services that perform payment operations

These are not available. It should be noted however that the main principle of the Federated Network is that “data access is free of charge” for Federal institutions.

2.6.8 Availability of catalogue services to extract and send data to a user application

The Ministry of Environment and Land Protection is developing such applications (see point 2.5.5.).

2.6.9 SDI user applications

At National level some SDI applications are available for registered user of the National Portal (e.g. evaluation of impact assessment). Various systems are in place at local/regional such as the Province of Bozen that is providing customized web interfaces for environmental planners (<http://www.provincia.bz.it/umweltagentur/>) or urban planners. Similarly the Piedmont region has created the SITAD portal.

2.6.10 Availability of geo-processing services

A Map service and gazetteer service is available.

2.6.11 Conclusions of Component 5

New regional portals emerged (e.g. Sardinia SITR-IDT) that include standard services (discovery, view, download, transformation) for geographical data access and publication as well as the National Cartographic Portal (<http://www.pcn.minambiente.it>). There are more than 20 services that allow visualisation of INSPIRE theme data. The WMS, WFS and WCS available services of the National Cartographic Portal allow the integrated data to be interoperational.

Based on these conclusions we score the indicators as follows:

- There are one or more discovery services making it possible to search for data and services through metadata
- There are one or more view services available for to visualise data from the themes of the INSPIRE annexes
- There are one ore more on-line download services enabling (parts of) copies of datasets (Not so clear)

- There are one or more transformation services enabling spatial datasets to be transformed to achieve interoperability (No Information found)
- There are one or more middleware services allowing data services to be invoked (Not so clear)

2.7 Component 6: Thematic environmental data

Since overall coordination of the *Intesa* rests with the Ministry of Environment and Land Protection (<http://www.minambiente.it>), the environmental component is expected to be pertinently present. The National Digital Mapping Portal offers thematic environmental data (see Section 2.6.2).

Using the coordination of the Ministry of Environment, all the Regions realized a complete coverage of the national territory with Land Use CORINE Land Cover Level 3.

At the time there is a work in progress to extend the Land Cover classification for parts of Italy to Level 4, i.e. at an equivalent map scale of 1:10.000)

The nation-wide information layer of the Environmental Protected Areas at different protection levels is now available for the national, regional, and municipal scales.

Regional authorities also create thematic environmental data in a more or less independent and non-standardised way.

2.7.1 Conclusions of Component 6

Based on the information provided on the previous paragraph we score the indicator as follows:

- Thematic environmental data are covered by the described SDI-initiative or there is an independent thematic environmental SDI

2.8 Standards

In Italy, operational guidelines have been delivered by the Italian national authority for geographic data (CNIPA, *Centro Nazionale per l'Informatica nella Pubblica Amministrazione*). In 2006, CNIPA has delivered two drafts of technical guidelines for creating and updating a National Register of Spatial Data (*Repertorio Nazionale dei Dati Territoriali*, RNDT). The RNDT should collect metadata of all geographic data produced by the Italian public administrations, in order to create a national catalogue. The drafts

explained the metadata organisation that Public Administrations should adopt to feed the RNDT. They contained the mandatory plus some optional fields of the EN ISO19115:2005 core set of metadata. The last version in 2008 fully implemented the INSPIRE metadata IR (<http://www.cnipa.gov.it/site/it-IT/>).

Furthermore, AMFM GIS Italy is a non profit organization formed to promote the exchange of knowledge and experience between public and private sector Geographic Information and Spatial Information, and promote the development of applications for the territorial government and the management services and infrastructure. The Association promotes the standardization of methodologies and processes, communication, sharing of geographical data in order to promote interoperability and sharing application (<http://www.amfm.it/>).

It should be noted that for most of the geoportals and websites build by the various stakeholders and regions most if not all INSPIRE implementing rules have been followed, and also several ISO 19100 standards have been implemented in the conceptual model of the database. SITR-IDT for example is compliant to the ISO 19115 standard and is therefore interoperable with other Spatial Data Infrastructure. At the same time SITR-IDT interoperability services for data exposition and publication are made according to the Open Geospatial Consortium (OGC) standard; WMS (Web Map Service) and WFS (Web Feature Service) are exposed by SITR-IDT and can be used by all standard web and desktop clients for viewing and downloading data existing in SITR-IDT spatial database.

2.8.1 Conclusions of Component 7

CNIPA national technical specifications are guiding the standards implementation and all new services (e.g. Ambiente in Comune) have been designed according to the international OpenGis standards.

Based on these conclusions we score the indicator as follows:

- The SDI-initiative is devoting significant attention to standardisation issues

2.9 Use and efficiency of SDI

The Digital National Mapping Portal Federated Network is growing every day. The experimental Central Node (<http://www.pcn.minambiente.it/PCN/>) started by offering only few functions, but it is an amazing evolutive prototype and users can understand the potential of the system. In fact there are hundreds of requests of public administrations and private bodies to join the Network as “Federated Institution” (Ente Federato) or as simply “Supplying Institutions” (Ente Fornitore). Nevertheless some data providers are still reluctant to adhere to the INtesa agreement and to get involved in the consequential actions.

Moreover, the Extraordinary Plan of Environmental Remote Sensing (EPRS-E) is an agreement program between the Ministry of Environment and Territory of the Sea (METS), Chairperson of the Council of Ministers - Department of Civil Protection (DCP) and the Ministry of Defence (MD) in agreement with the Regions and Autonomous Provinces. The aim of the Extraordinary Plan of Environmental Remote Sensing is to undertake, for the first time, the establishment of a data base representative of national territory, with particular emphasis on its configuration, its relation to the environment. In particular, the project involves the acquisition by the Ministry, of data produced by remote sensing technique with laser-scanning LiDAR (by platform) and interferometric technique (by satellite) and the classification of these data in the database of National Cartographic Portal (NCP).

The databases will be a valuable contribution to the government activities on the territory, particularly supporting the activities of topography, mapping and digital photogrammetry, three-dimensional modelling, Geographic Information Systems and, above all, the Information Systems Supporting decisions. The first aim of the EPRS-E is to create, as quickly as possible, a database to support decision making in all areas subject to hydrogeological risk and encourage the sharing of a data set of methodologies and results.

An interesting project is the system for the dissemination of geographical and thematic information on landslides and floods in Italy. In the framework of the Integrated Management of the Environmental Data project – GIIDA – of the Italian National Research Council (CNR), the research Institute for Geo-Hydrological Hazard Assessment (IRPI) has designed and implemented a new Spatial Data Infrastructure (SDI). The SDI is compliant to Open Geospatial Consortium (OGC) specifications for the publication, access, and discovery of dedicated services, including WMS, WFS, WCS and CSW services.

CNR IRPI is developing a national landslide warning system for the Italian Department for Civil Protection, DPC. The system is intended to provide spatially distributed daily (and potentially 3-hour) forecasts for the possible occurrence of rainfall-induced landslides in Italy. It consists of two main components: (i) a component for rainfall data analysis and processing, and comparison with existing empirical rainfall thresholds, and (ii) a component for information delivery and dissemination, using WebGIS technology (Marchesini et al., 2010).

Software used to implement the CNR IRPI Spatial Data Infrastructure for storing, managing, and publishing landslide and flood data includes:

- (i) PostgreSQL 8.2.11 + PostGIS 1.3.5, a powerful RDBMS with spatial extension,
- (ii) Geoserver 1.7.4, a Java server that allows users to share and edit geospatial data using a graphical frontend,
- (iii) Geonetwork OS 2.4, a catalogue application to manage spatially referenced resources,

- (iv) ExtJS 3.0 + GeoExt 0.6 + OpenLayers 2.8, a set of JavaScript libraries for building rich Web mapping applications,
- (v) UNM MapServer 5.0.2, a platform for publishing spatial data and interactive mapping applications on the Web, and
- (vi) GeoSDI ERA 0.1, a Web application designed by GeoSDI (www.geosdi.org) for the Italian national Department of Civil Protection.

3 Annexes

3.1 List of SDI addresses / contacts for Italy

Table: SDI contact list			
	Web address	Organisational mailing address	Over-all contact person: tel./fax/e-mail
National			
CTSGI: Comitato per le regole tecniche sui dati territoriali delle pubbliche amministrazioni		Comitato per le regole tecniche sui dati territoriali delle pubbliche amministrazioni presso CNIPA – Via Isonzo 21/b 00198 Roma (Italy)	Mr. Benzi Roberto, President benzi@cnipa.it
		Technical secretariat of the CTSGI: CNIPA	Mrs. Cappadozzi Elettra +390685264346 cappadozzi@cnipa.it Mr. Ciasullo Gabriele +390685264285 ciasullo@cnipa.it
	http://www.minambiente.it/	Ministero dell’Ambiente e Tutela del Territorio Via Cristoforo Colombo, n. 44 00147 – Roma, ITALIA Centralino: 06.57221	Ing. Bruno Agricola Director General +39-06-57223001 +39-06-57223042 dgab@minambiente.it
Regional			
Local			

3.2 List of references for Italy

Table: list of references used to compile the Country Report	
Web sites:	
	http://www.eurogogi.org , presentation of AM/FM Italy

	http://www.EuroGeographics.org
	http://www.sifet.it/
	http://www.asita.it/fondatori.htm
	http://www.nettuno.it/fiera/igmi/uk_version/igmuk.htm
	http://www.asita.it/ait/
	http://www.gisform.it/#
	http://http://www.centrointerregionale.it/
	http://www.intesagis.it
	http://www.sistemacartograficonazionale.it/website/gerarchie/viewer.htm
	http://www.provincia.bz.it/
	http://www.atlanteitaliano.it/
	http://www.sinanet.anpa.it/
	http://www.minambiente.it/Sito/settori_azione/sdm/cis/yourcountry/index.htm
	http://cart.ancitel.it/
	http://www.cadcorp.com/pdf/PPT-inspire%20paper.pdf
	http://www.cartografia.regione.lombardia.it/geoportale
	http://www.pcn.minambiente.it/PCN/index.php?lan=en
	http://www.centrointerregionale-gis.it/script/documenti.asp
	http://sardegnaterritorio.it/
	http://www.amfm.it/
	http://www.cnipa.gov.it/site/it-IT/
Publications:	
	University of Sheffield – USDF, Spatial Data Infrastructures: Country Reports, Final deliverable D 5.3.2(b) of the GINIE project, IST-2000-29493
	Annoni A., M. Craglia, P. Smit, Comparative analysis of NSDI, paper presented at the 8 th EC-GIS workshop, 2-5 July, 2002, Dublin, Ireland.
	Panunzi P., F. Guaralda, The Reform and the New Systems of Census and Classification of the Italian Cadastre, paper presented at the FIG XXII International Congress, April 19-26, 2002, Washington, USA.

	M., Pasca, L., Petriglia, F., Mattioni, M., Torchio, and C., Mariotti. 2009. Experiences in the Creation and Updating of INSPIRE Compliant Metadata Catalogue. GSDI 11, Rotterdam, 2009.
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