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Plan4all

Analysis of conceptual data models for selected themes used in single countries

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Author(s)	*Flavio Camerata, Giuseppina Pellegrino*

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[1] OJ L 79, 24.3.2005, p. 1.

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1. Preliminary notes

1.1. List of abbreviations

- AS: Application Schema.
- Rec: Recommendation (not mandatory) for the development of harmonised data specifications, followed by number as listed in the document "INSPIRE Generic Conceptual Model D2.5 v3.2".
- Req: Requirement (mandatory) for the development of harmonised data specifications, followed by number as listed in the document "INSPIRE Generic Conceptual Model D2.5 v3.2".
- INSPIRE themes:
  - LC: Land cover
  - LU: Land use
  - US: Utility and governmental services
  - PF: Production and industrial facilities
  - AF: Agriculture and aquaculture facilities
  - AM: Area management/restriction/regulation zones and reporting units
  - NR: Natural risk zones.

1.2. General information about single countries

The general information about the situation of each single country (section 1 of the questionnaire) is reported in a table like the one below:

Name of partner providing information
Country
o Name of the sub-section of the questionnaire (numbers referring to the single questions) Here is a brief explanation of the answers provided by the respondents for each section of the questionnaire.

1.3. Information on case studies

The specific information about the single case studies (section 2 of the questionnaire) is reported in a table like the one below:

Case study code	Country of origin of case study	Name of partner providing information	INSPIRE theme/themes covered
Name of the case study provided			
Name of documents and/or links provided by the respondent			
o Name of the sub-section of the questionnaire (numbers referring to the single questions) Here is a brief explanation of the answers provided by the respondents for each section of the questionnaire.			
Compliance with INSPIRE Here is a chart showing for how many aspects the case study is compliant/not compliant with the INSPIRE implementing rules related to Data Specifications. The figures shown are the sum of the "yes" and "no" answers.			

2. Introduction

This report gives an overview on the results of the work done in Task 4.1 for collecting examples of data specifications from the European countries of the Plan4all consortium. These results are meant to be the basis of the work to be done in Task 4.2, when common data models for the seven selected INSPIRE themes will have to be developed taking into account the existing material and the developers' and users' needs.
The activities carried out had two main objectives:

- collecting existing data specifications for the seven selected INSPIRE themes: this has been essential in order to provide a good basis for the following project task;
- checking the compliance of the existing data specifications to INSPIRE - in particular to the requirements and recommendations that can be found in the document "INSPIRE Generic Conceptual Model D2.5 - v3.2". This allowed to have an overview of the proximities and distances of the current European situation in respect to INSPIRE; and to set the basis for providing the INSPIRE implementation process with some suggestions regarding the possible difficulties of the data providers and managers in complying with its requirements and recommendations.

2.1. Methodology: the questionnaire

A questionnaire (Annexes III and IV) has been specifically prepared for collecting information about the existing data specifications around Europe.
During the meeting in Malta on 29th and 30th October 2009, WP4 partners decided to appoint one coordinator for each country of the consortium, in charge of choosing and collecting the "case studies", taking care of the relations with the institutions providing them, filling in the questionnaire and submitting it. The appointed country coordinators were:

- AVINET for Norway;
- CEIT for Austria;
- DIPSU for Italy;
- ISOCARP for the Netherlands;
- LGV for Germany;
- MAC for Ireland;
- MEEDDM for France;
- TDF for Latvia;
- UWB for Czech Republic.

In order to have a preliminary overview on the availability of examples covering all the seven chosen INSPIRE themes, a survey was carried out among the country coordinators in November 2009. The survey showed a quite good coverage of the INSPIRE themes, the most covered being Land cover and Land use. The questionnaire prepared for the survey can be found in Annex I. The case studies suggested within the survey are not necessarily the same that have been described later in the final questionnaires, but this activity was anyhow useful in order to have a first idea of what kind of contributions were going to be received.
As explained in the guidelines of the final questionnaire (Annex II), this is divided in two parts: the former is about the general situation of the country, the latter is case-study specific, and had to be filled in once for each case study chosen by the respondent. The country coordinators were requested to provide those case studies that they deemed to be the most relevant or representative of the situation in their countries. For each of these, they had to answer a series of questions about the compliance with the requirements and recommendations of the INSPIRE implementing rules. The questionnaire contained also free

text fields so as to allow the respondent to explain/justify why certain issues, recommended or required by INSPIRE, have not been taken into consideration.
More information about the structure and methodology of the questionnaire can be found in the guidelines in Annex II.

3. Statistics on results of questionnaire

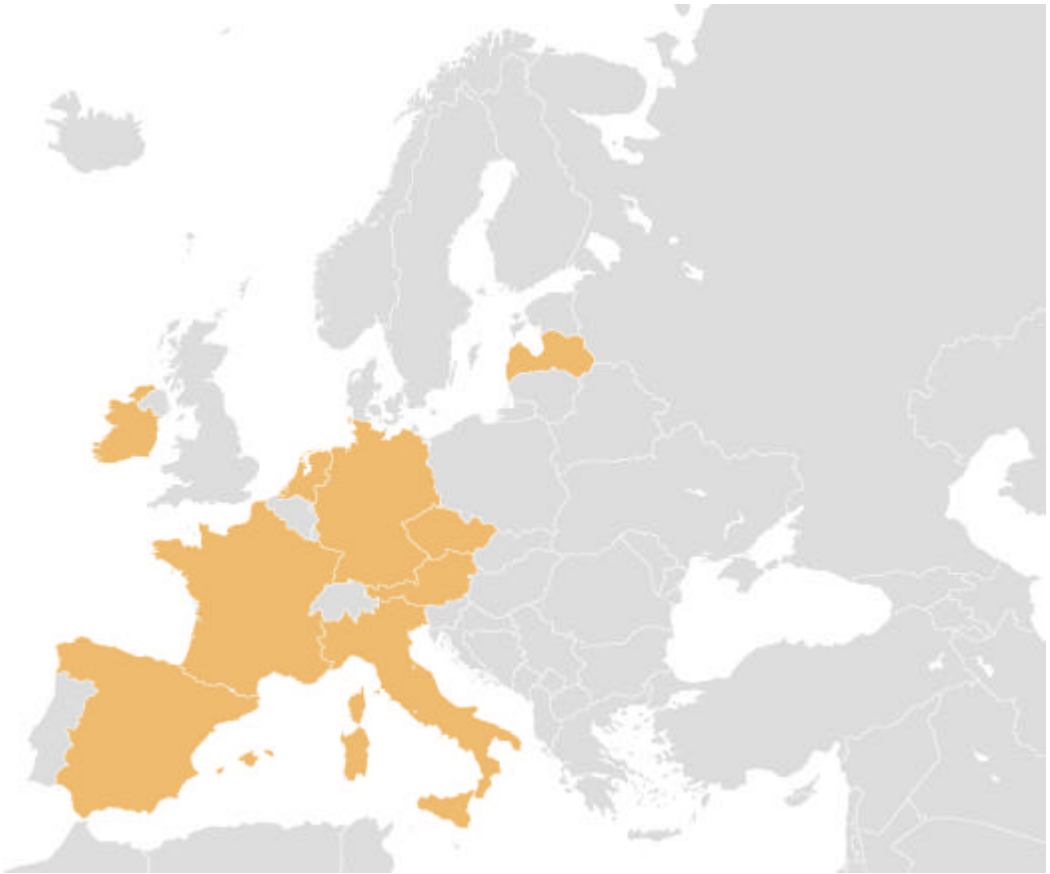
This section shows some statistics about the results of the questionnaire that has been sent to partners in order to collect case studies and provide a first contribution to their analysis.

3.1. Respondents

The following partners have responded to the questionnaire, providing information about their own countries:

- CEIT (Austria);
- DIPSU (Italy[1]);
- ISOCARP (the Netherlands);
- LGV (Germany);
- MAC (Ireland);
- MEEDDM (France[2]);
- TDF (Latvia);
- UWB (Czech Republic).

Out of the nine country coordinators who were requested to fill in the questionnaire, eight have responded. A total number of 19 case studies have been collected, out of 35 that were initially proposed in the preliminary survey.



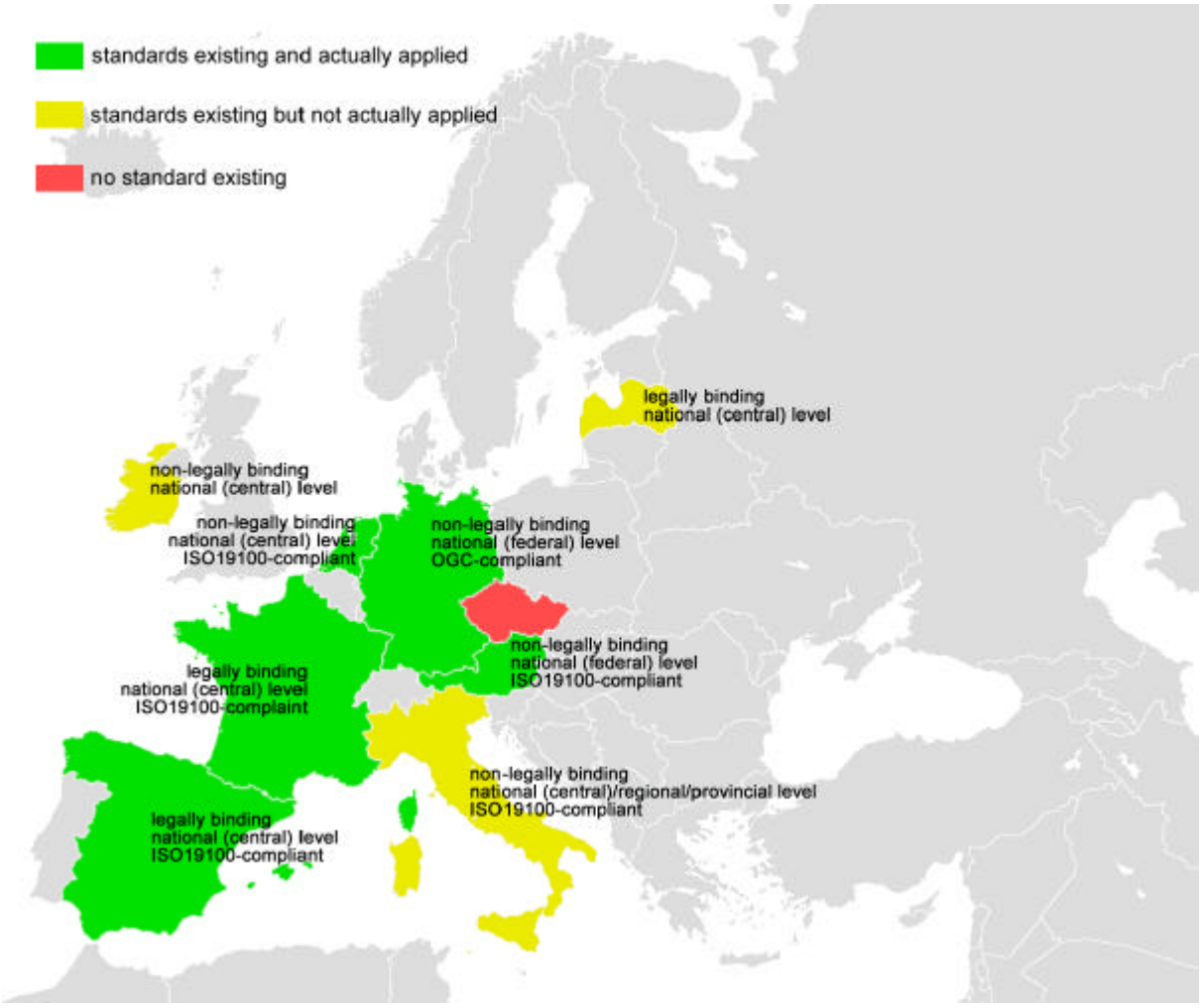
Data models received: European countries covered.

[1] DIPSU has provided information also on the national situation in Spain and on a Spanish case study.

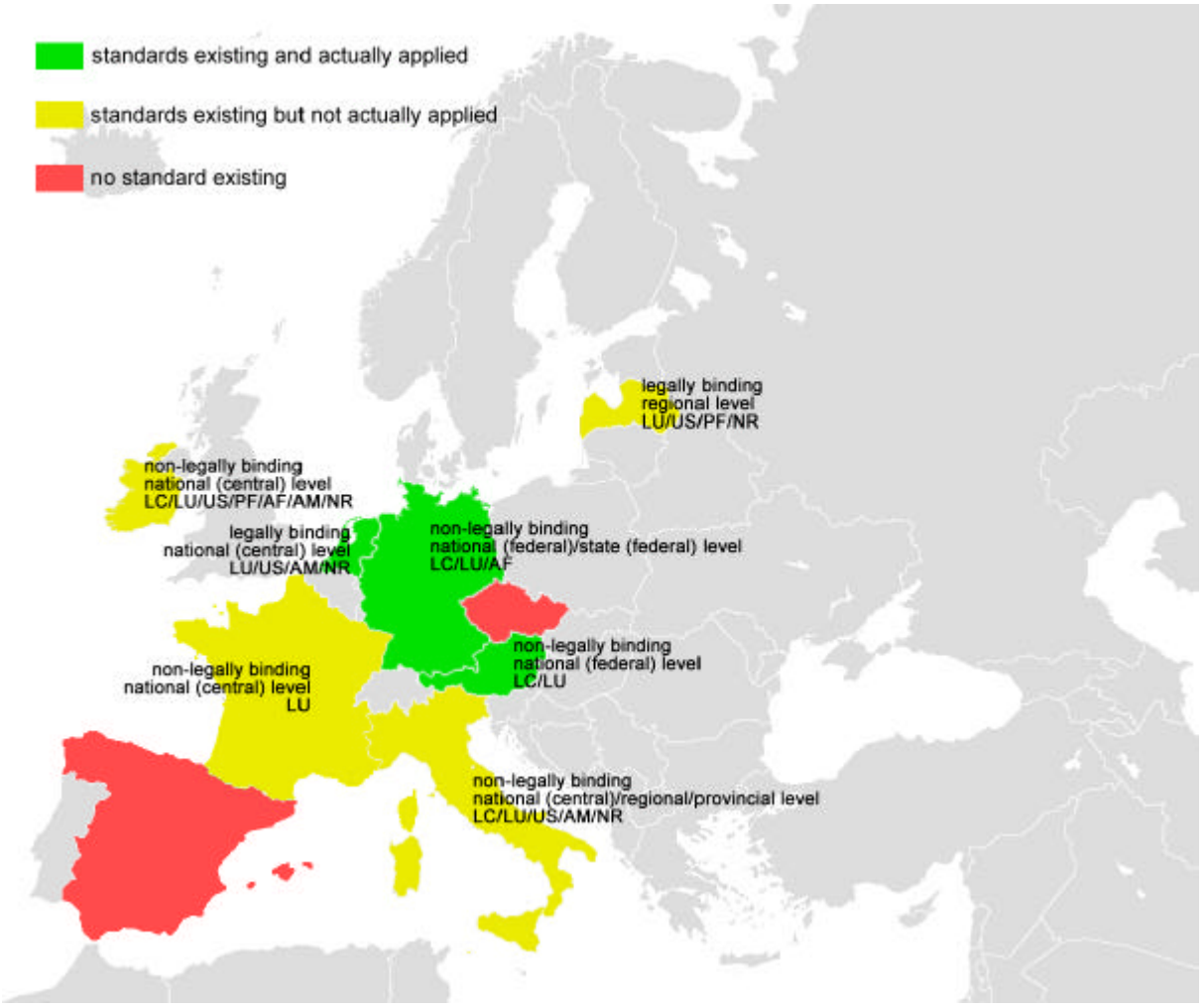
[2] MEEDDM has provided information also on CORINE Land Cover.

3.2. First part of the questionnaire

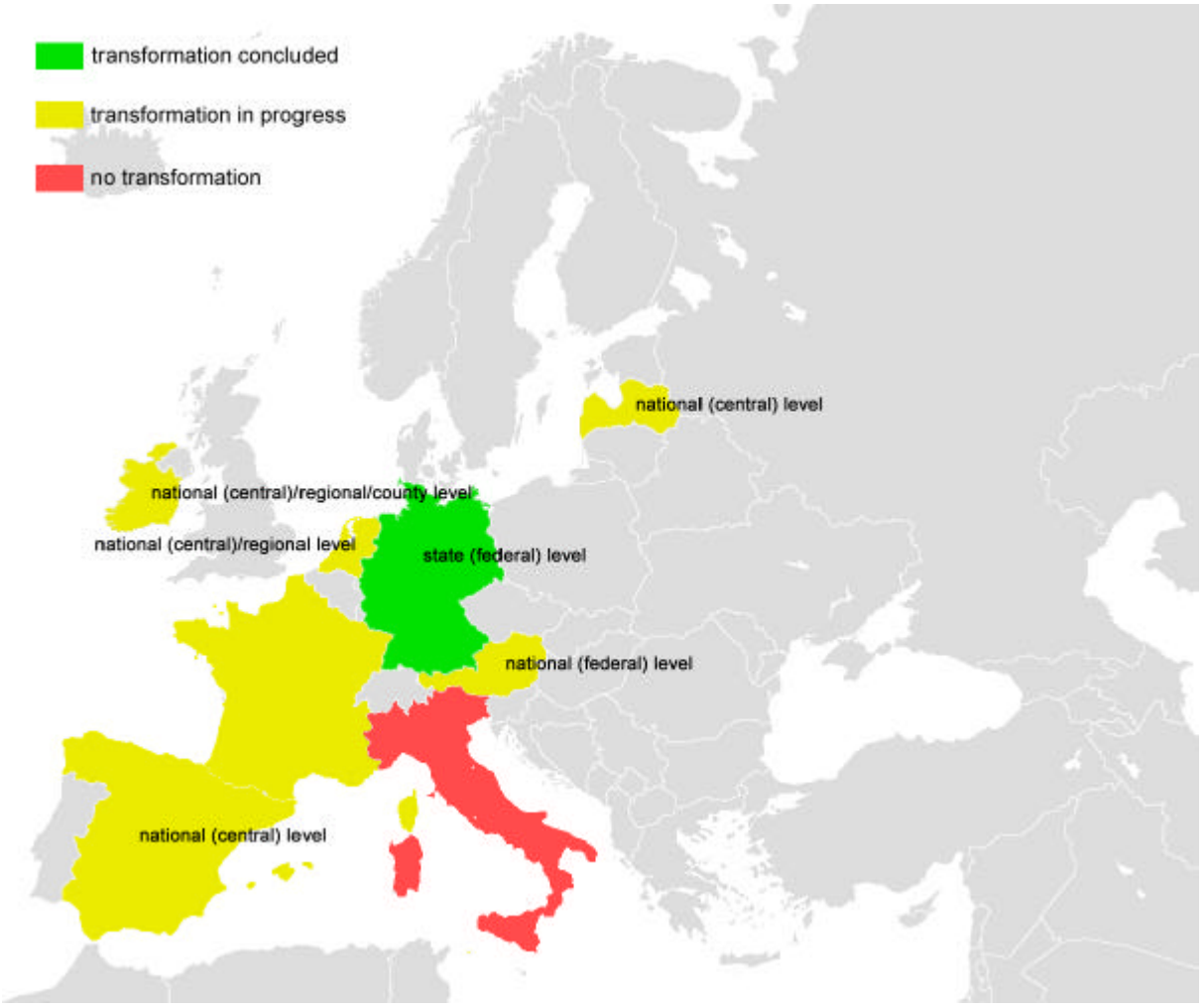
The following maps show the information collected with the first part of the questionnaire. For more information on the specific questions please see Annex III.



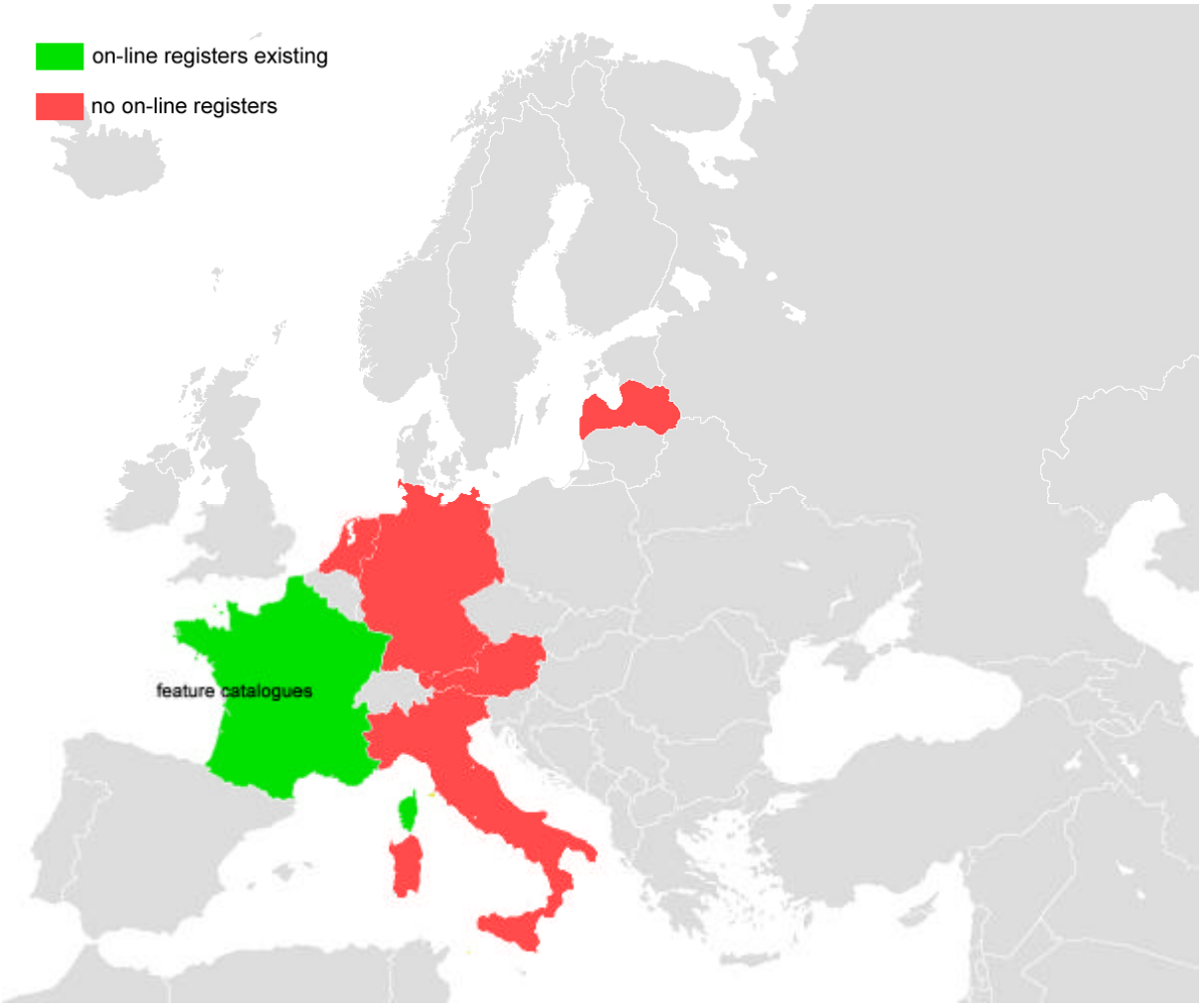
Standards for the development of data specifications.



Standards for conceptual data modelling of spatial information.
Codes refer to the INSPIRE themes for which the standards exist.



Status of data transformation between local data specifications and INSPIRE data specifications.
Information on the administrative level taking care of data transformation.

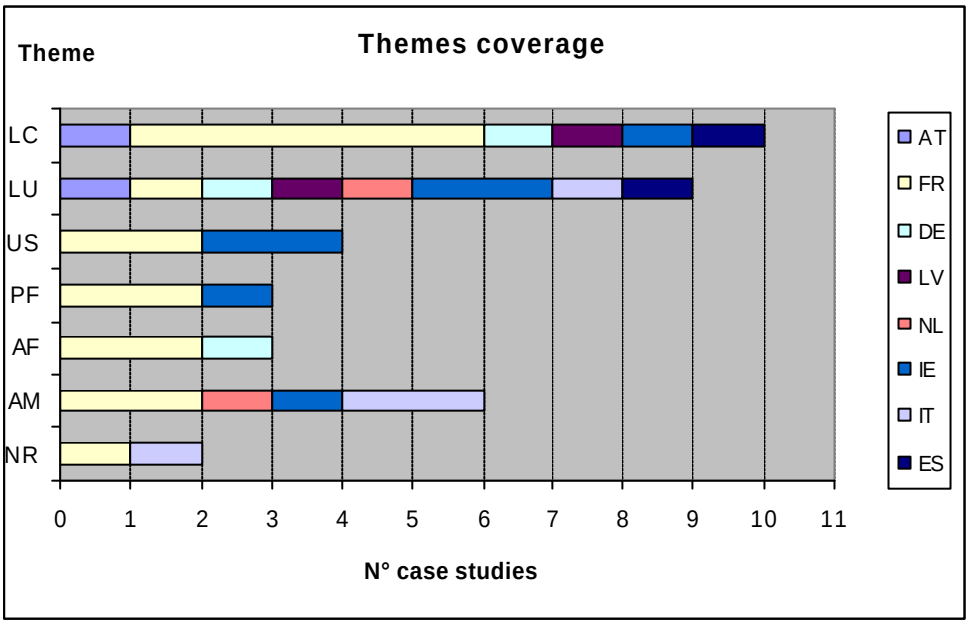


Presence of ISO 19135-conformant on-line registers of feature catalogues, application schemas, code lists, coordinate reference systems, units of measurements, external object identifier namespaces.

3.3. Second part of the questionnaire

3.3.1 Coverage of INSPIRE Plan4all themes

It has to be said that many data specifications collected cover more than one INSPIRE theme, and often the themes are covered only partially. The themes are often overlapping, and specifying what theme is covered by each case study has of course some degree of subjectivity in it; anyways, the outcomes of the questionnaire have been quite satisfying as regards the coverage of the seven themes. The following diagram illustrates the coverage of the themes, according to the partners' responses. On the left, the abbreviations for the INSPIRE themes; the different colours indicate from what countries the case studies come from (legend on the right).



Coverage of the seven INSPIRE themes.

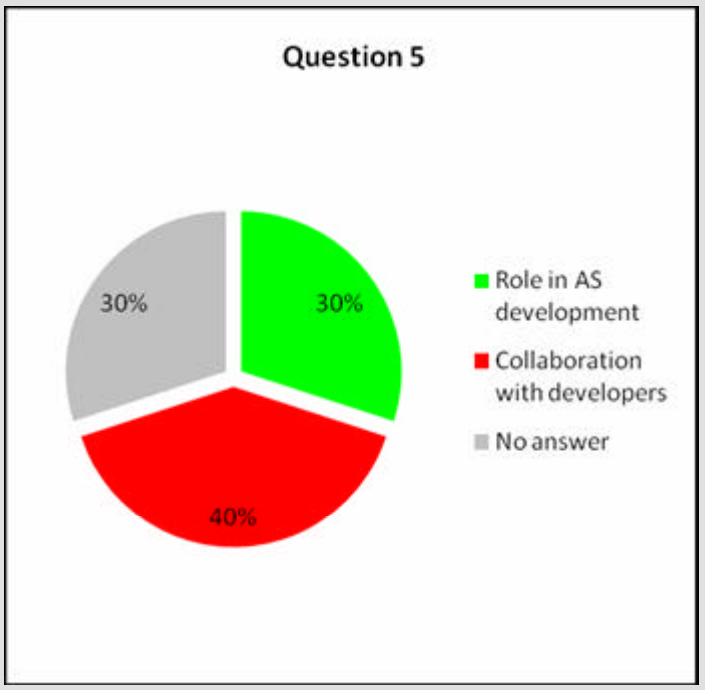
The diagram clearly shows that "Land cover" and "Land use" are by far the most covered by the case studies provided by partners; whereas "Natural risk zones" is covered by two case studies only.

3.3.2 Statistics on compliance with INSPIRE

The following table shows some overall statistics on the single answers given to section 2 of the questionnaire, mostly referring to the requirements and recommendations of the INSPIRE implementing rules, listed in the document "INSPIRE Generic Conceptual Model D2.5 - v3.2". This gives an overview on the compliance with INSPIRE of the whole set of case studies.

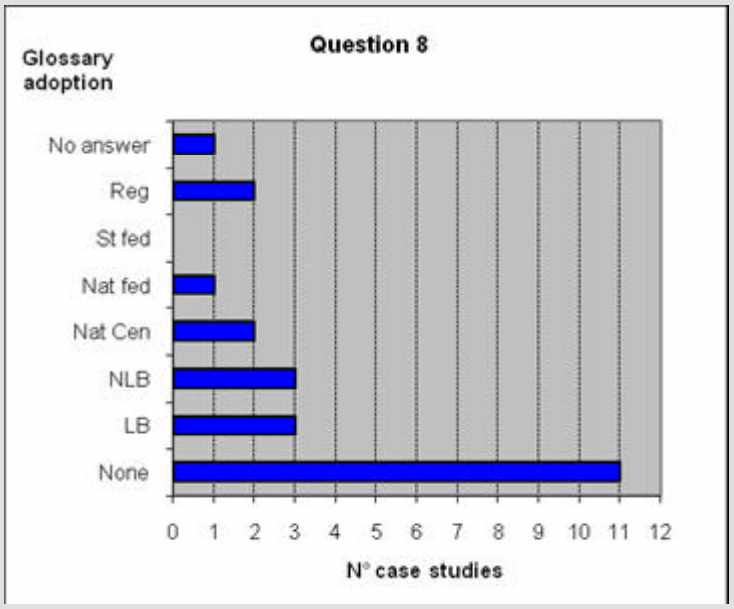
- **Role of respondents in development of AS (5)**

A minority of respondents had a role in the development of the data specifications provided, while most of the others had anyhow contacts with the direct developers for filling in the questionnaire.
For 14 of the 19 case studies received, the respondents declared that the developers are available in being involved in the future testing of the Plan4all Application Schemas.



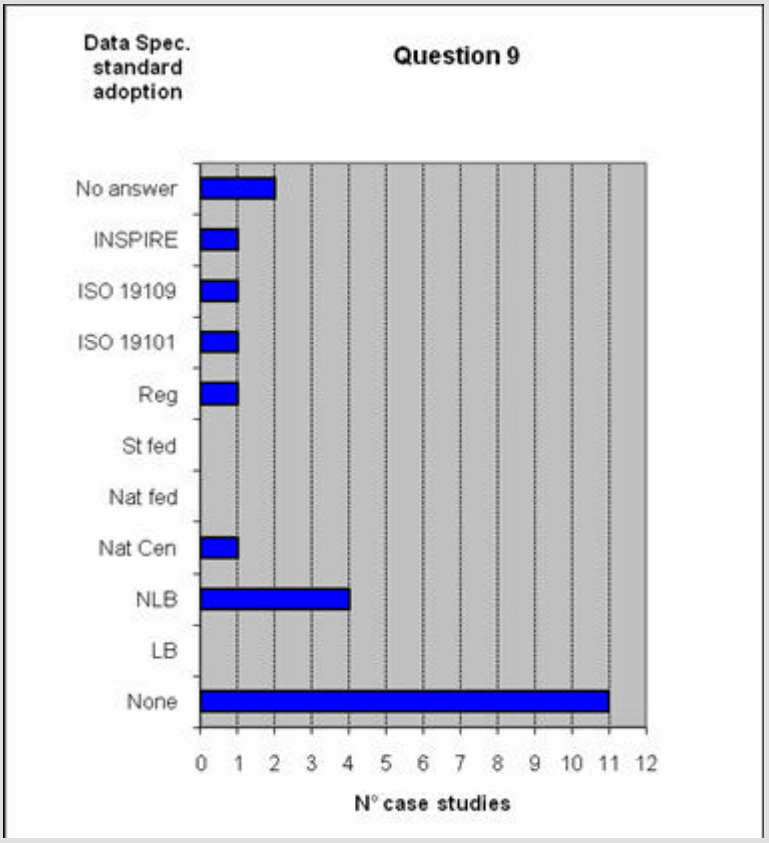
- **Terminology (8)**

For the majority of the case studies, no standard glossary - containing general terms and definitions regarding geographic information and spatial data planning - has been adopted.



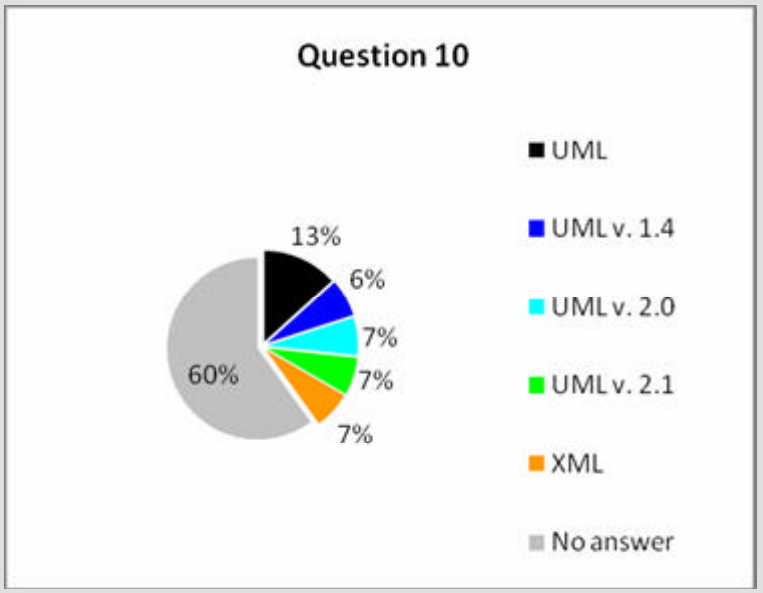
- **Reference model (9)**

For the majority of the case studies, no particular standard has been adopted for the development of the data specifications; and where it has been adopted, is a non legally binding standard.

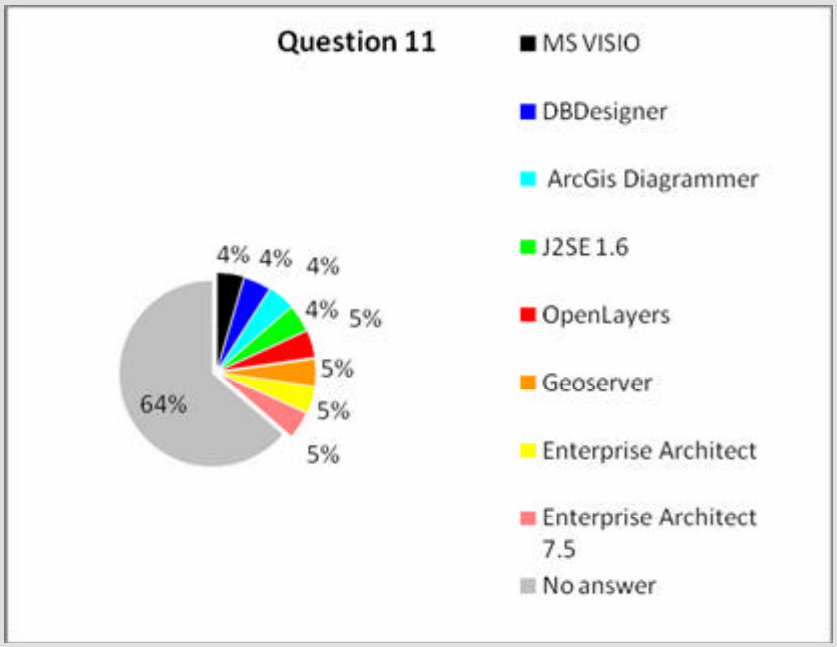


- **Rules for Application Schemas and Feature Catalogues (10-13)**

UML - in its different versions - is often adopted as a language for expressing the data models. In many cases though, only a simple text language, with an alphanumeric code for describing the hierarchy, has been adopted to express the data model.

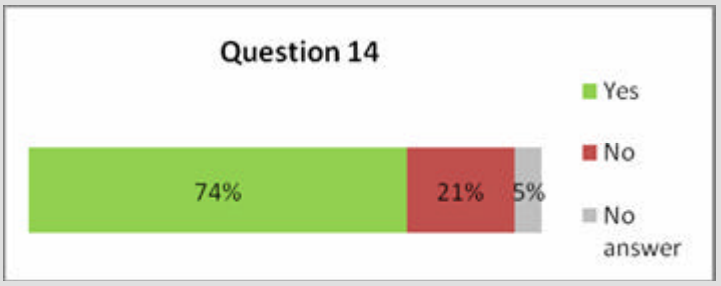


A variety of software solutions have been adopted for developing the UML diagrams. For the cases where there was no answer to this question, see comments to the previous question.

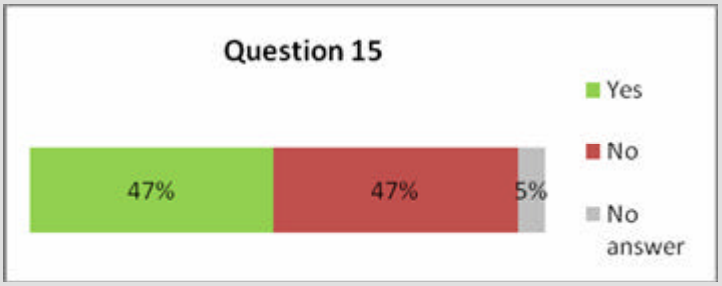


- **Spatial and temporal aspects (14-15)**

In the majority of cases, there are rules to express spatial characteristics of spatial objects satisfying Req 36.

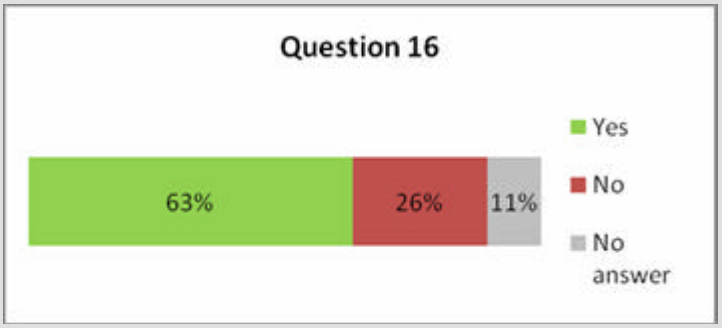


In half of the cases, there are no rules to express temporal characteristics of spatial objects satisfying Req 37.

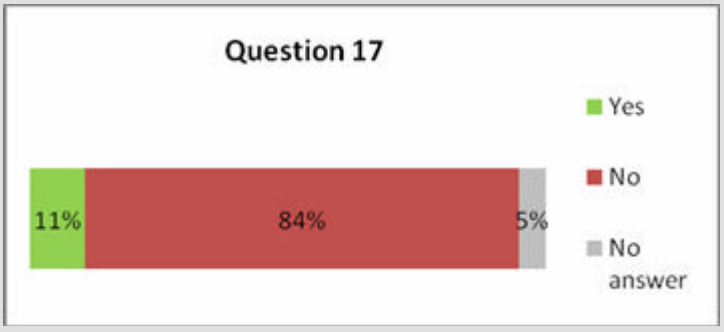


- **Multi-lingual text and cultural adaptability (16-17)**

Code lists and enumerations are often used whenever possible, instead of free text attributes, as recommended by Rec 12.

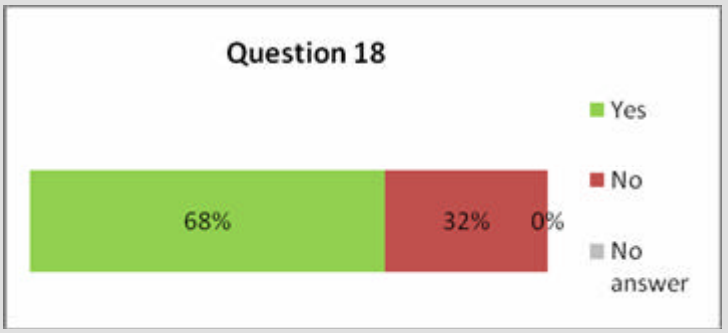


The code lists are rarely multi-lingual (Req 47). This is due to the fact that the data specifications are often produced to meet the needs of planning actors sharing the same language within the same national legal framework.

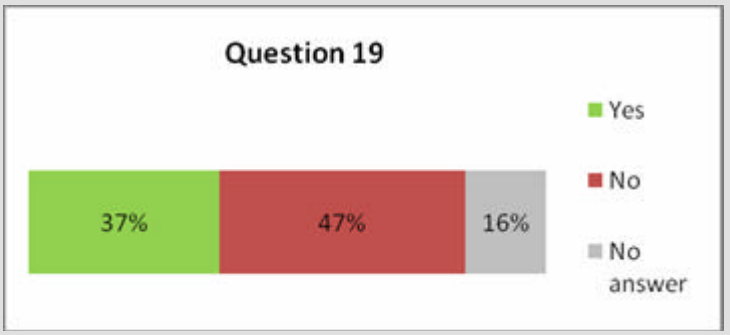


- **Coordinate referencing and units of measurement model (18-19)**

In the majority of cases, there are lists of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51.

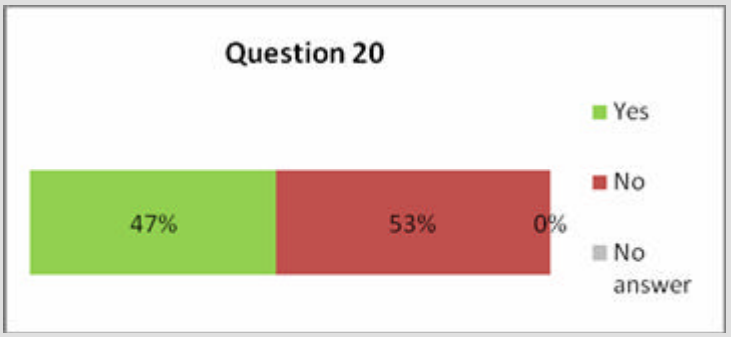


On the other hand, lists of temporal reference systems that may be used in the encoding of spatial objects - as required by Req 54 - are less used.



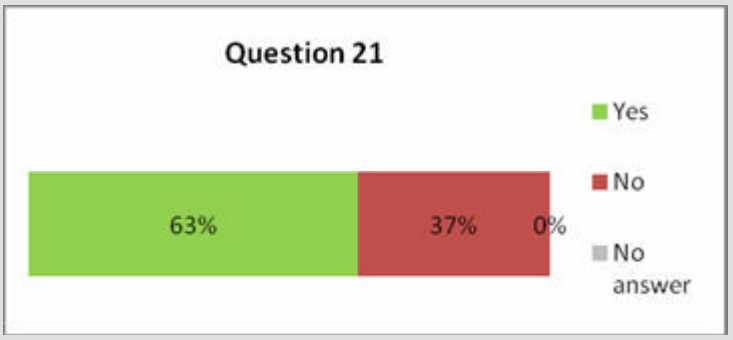
- **Modelling object references (20)**

For almost one half of the case studies, spatial objects are, where possible, spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.



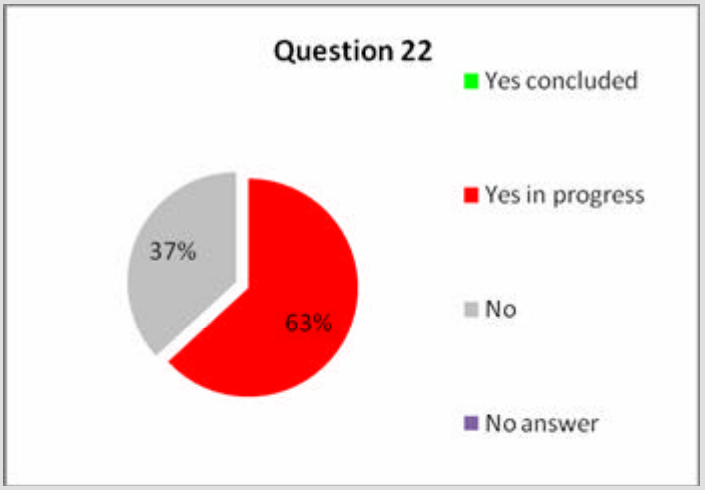
- **Identifier management (21)**

For the majority of the case studies, every spatial object type has a property of type ”Identifier” for the unique identification of spatial objects, as required by Req 58.



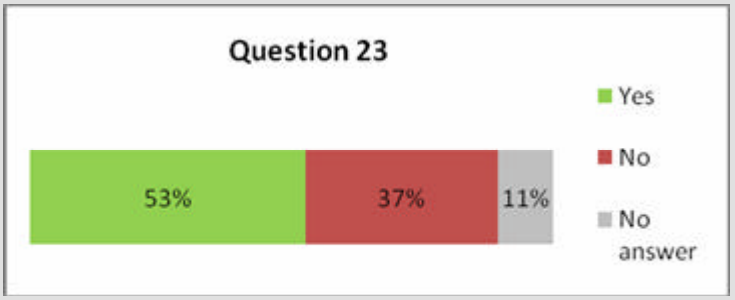
- **Data transformation (22)**

For the majority of the case studies, the data transformation to the corresponding INSPIRE data specifications is in progress.

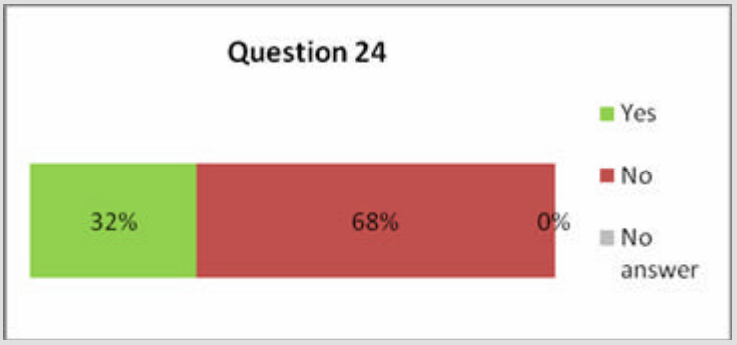


- **Metadata (23-26)**

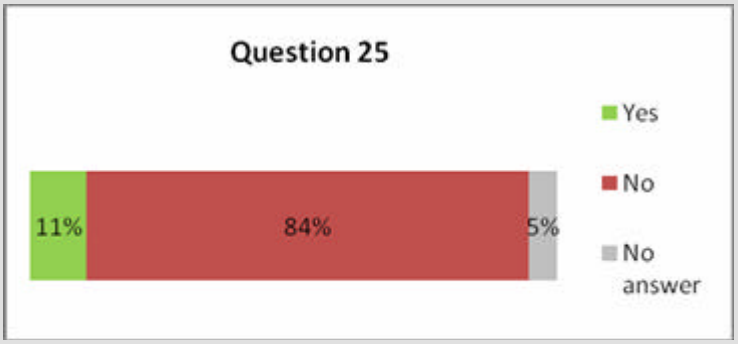
Metadata elements are often complying with ISO 19115, as required by Req 64.



In the majority of cases, there aren't metadata schemas integrated into the AS.

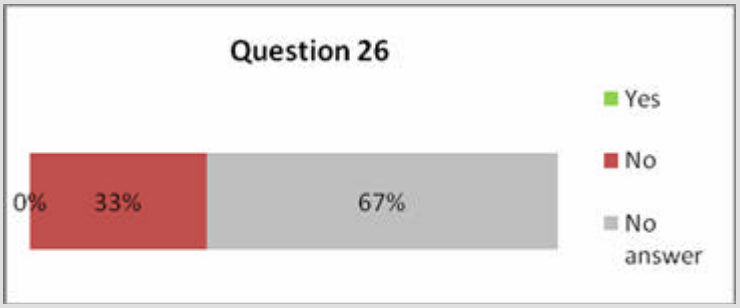


Metadata types from ISO 19115 have been extended for almost none of the case studies.



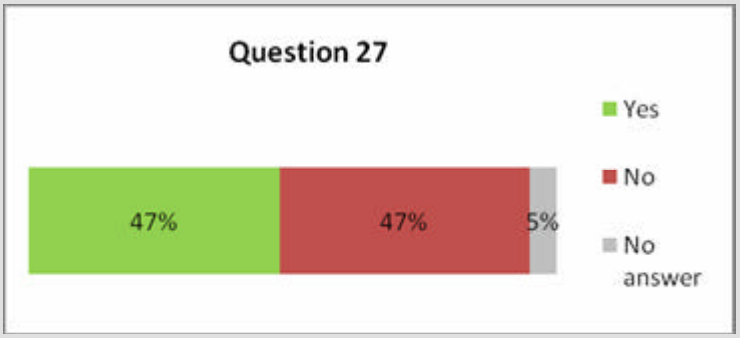
- **Question 26**

In the only two cases where metadata types from ISO 19115 have been extended, the extensions don't conform to ISO 19109 and 19115.

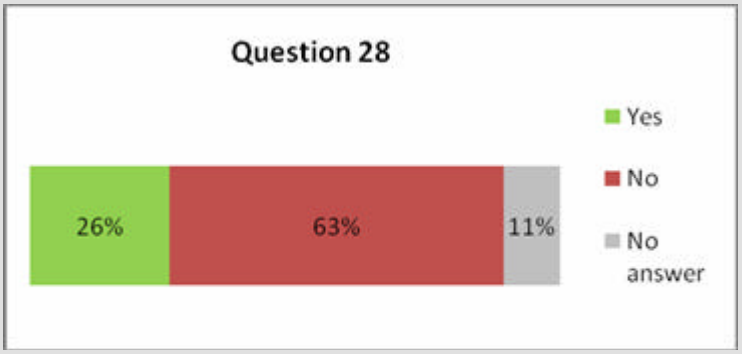


- **Maintenance (27-28)**

For almost one half of the case studies, maintenance procedures are specified as part of the data specifications.

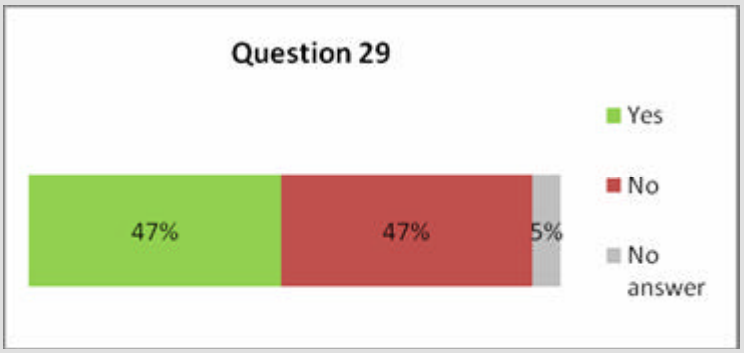


For the majority of the case studies, the possible reasons for changes in spatial objects are not documented as part of the metadata.



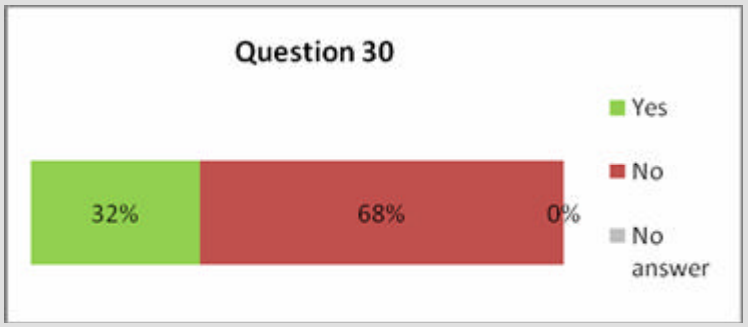
- **Data and information quality (29)**

For almost one half of the case studies, data quality elements and sub-elements are provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

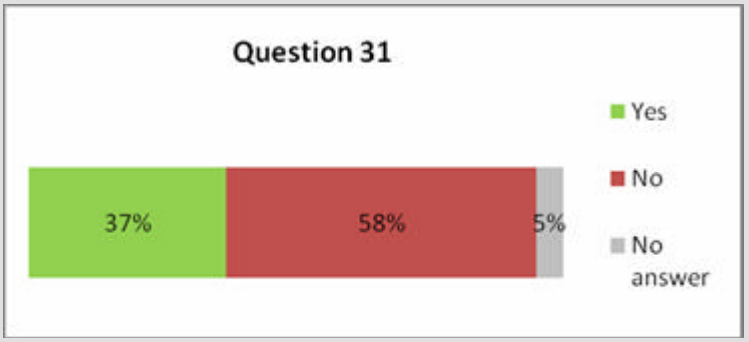


- **Consistency between data (30-31)**

The representations are rarely consistent one to another, as recommended by Rec 28, in cases where multiple levels of detail are specified for a theme.

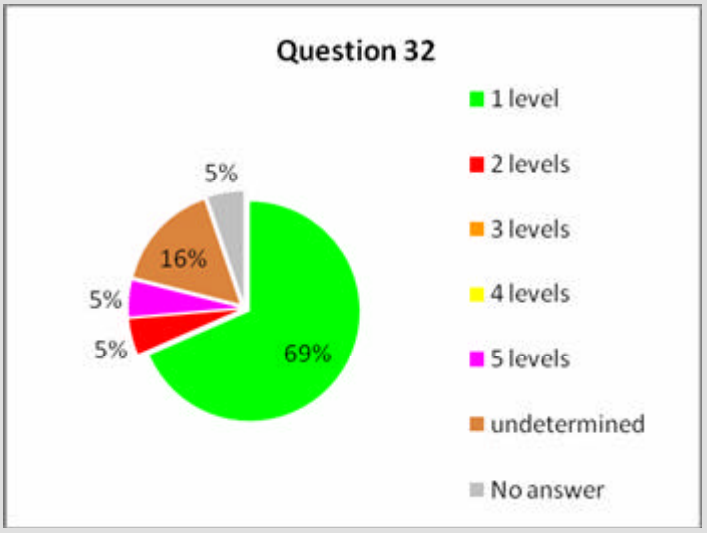


For the majority of the cases studies, the AS doesn't address the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69.

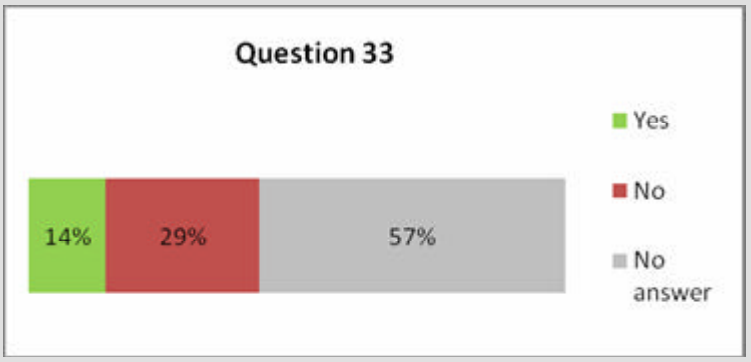


- **Multiple representations (32-33)**

In the majority of cases, there is only one level of detail defined per theme (Rec29).

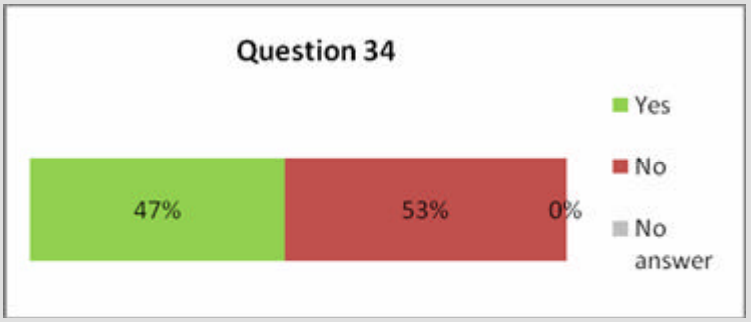


Among the cases where multiple levels of detail per theme are required, this requirement is only in one case justified and documented as part of the data specifications (Req 72).



- **Data capturing rules (34)**

For almost one half of the case studies, capturing rules are specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.



4. General overview on single countries

This section, starting from the results of the first part of the questionnaire, gives a general overview on the existing standards in the different countries and on their compliance with ISO and INSPIRE.

CEIT
Austria
o Reference model (2-10) There is a non-legally binding standard for the development of data specifications, on national (federal) level, the so called ÖNORM (Austrian standard). It has actually been applied (or at least, application is in progress), and it complies with ISO 19100 standards, in detail: ISO19115-Metadata, 19119-Services, 19110-Methodology for feature cataloguing. o Rules for application schemas and feature catalogues (11-20) There is a non-legally binding standard for conceptual data modelling of spatial information, on National (federal) level, which covers LC and LU themes. It has actually been applied (or at least, wide application is in progress), and it complies with ISO 19100 standards, although the respondent didn't specify if ISO 19109-Rules for application schema have been applied. No documentation about the standard has been provided. o Data transformation (21-24) Austria is going to take care of data transformation between its own data specifications and the corresponding INSPIRE data specifications through a national (federal) programme in progress. o Registers and registries (25-27) There aren't examples of ISO 19135-compliant on-line registers of feature catalogues, application schemas, code lists, coordinate reference systems, units of measurements, external object identifier namespaces.

UWB

Czech Republic

- Reference model (2-10)

There aren't standards for the development of data specifications in general.

- Rules for application schemas and feature catalogues (11-20)

There are non-legally binding standards for conceptual data modelling of spatial information, probably used just by private companies, which in Czech Republic are the most involved in SDI projects. Standards in general cover LC, AM, NR and Cadastral parcels themes, and adopt UML as conceptual modelling language. They haven't actually been applied, the assumed cause is that they are too complex and not widely known inside the SDI experts' community.

- Data transformation (21-24)

Czech Republic is going to take care of data transformation between its own data specifications (related to Cadastre, at the moment) and the corresponding INSPIRE data specifications through a national (centralized) programme in progress.

- Registers and registries (25-27)

No information has been provided about ISO 19135-compliant on-line registers of feature catalogues, application schemas, code lists, coordinate reference systems, units of measurements, external object identifier namespaces.

MEEDM

France

- Reference model (2-10)

There is a legally binding standard for the development of data specifications, on national (centralised) level. It has actually been applied, and it complies with EN ISO 19109 2006. The respondent states that in France the trend is to follow the INSPIRE methodology for defining data specifications. This is the case for the "Commission for defining geographical data" (COVADIS), recently created by two ministries (MEEDM and the Ministry of Agriculture).

- Rules for application schemas and feature catalogues (11-20)

There are non-legally binding standards for conceptual data modelling of spatial information, on national (centralised) level, which cover LU theme. They haven't actually been applied, but they are currently under finalisation. The respondent provided documentation about the standards.

- Data transformation (21-24)

In France, on national (centralised) level, data transformation between local data specifications and the corresponding INSPIRE data specifications is going to be performed.

- Registers and registries (25-27)

There are examples of ISO 19135-compliant on-line registers of feature catalogues, the respondent provided a hyperlink to an example registry: https://www.dgiwg.org/FAD/registers.jsp?register=DFDD, from the geoportal of the "Defence Geospatial Information Working Group" (DGIWG), an international organisation thet develops and maintains a suite of digital geospatial information (DGI) standards that foster the interchange, access and use of geographic information between the defence organisations of member nations (http://www.dgiwg.org/dgiwg/htm/about_DGIWG/member_nations.htm).

LGV

Germany

- Reference model (2-10)

There are non-legally binding standards for the development of data specifications, on national (federal) level. It has actually been applied, and it complies with OGC GML standard, XML schema, UML 1.3.

- Rules for application schemas and feature catalogues (11-20)

There are non-legally binding standards for conceptual data modelling of spatial information, on national (federal) and state (federal) level, which cover LC, LU and AF themes. They have actually been applied. The respondent provided documentation about the standards.

- Data transformation (21-24)

In Germany, on state (federal) level, data transformation between local data specifications and the corresponding INSPIRE data specifications has been performed already.

- Registers and registries (25-27)

There aren't examples of ISO 19135-conformant on-line registers of feature catalogues, application schemas, code lists, coordinate reference systems, units of measurements, external object identifier namespaces, although the respondent provided a hyperlink to an example registry for all German data models and XML exchange standards that are developed in the context of e-government projects (https://www.xrepository.deutschland-online.de/xrepository/). This registry need not be ISO-19135 compliant because there are enclosed non-spatial data models as well.

MAC

Ireland

- Reference model (2-10)

There are non-legally binding standards for the development of data specifications, on national (centralised) and regional level. They haven't actually been applied, the respondent states that future standards will be INSPIRE-compliant when implemented, but Ireland has still much work to do in the direction of compliance with INSPIRE.

- Rules for application schemas and feature catalogues (11-20)

There are non-legally binding standards for conceptual data modelling of spatial information, on national (centralised) and regional level, which cover each of the seven selected themes. They have not actually been applied, Ireland has still much work to do in the direction of compliance with INSPIRE. No documentation about the standards has been provided.

- Data transformation (21-24)

Ireland is going to take care of data transformation between its own data specifications and the corresponding INSPIRE data specifications through national (centralised), regional and county programmes in progress.

- Registers and registries (25-27)

No information has been provided about ISO 19135-compliant on-line registers of feature catalogues, application schemas, code lists, coordinate reference systems, units of measurements, external object identifier namespaces, although the respondent provided a hyperlink to an example metadata catalogue search engine (www.isde.ie).

DIPSU

Italy

- Reference model (2-10)

There are non-legally binding standards for the development of data specifications, on national (centralised), regional and provincial level; they should become legally binding in a few months though. They haven't actually been applied, the respondent states that almost all initiatives and best practices about data specifications started at local level, and then have been transposed at national level by interregional committees. Administrative decentralisation and lack of resources in public administrations make non-legally-binding national standards ineffective. Data specifications about metadata in general comply with ISO 19115.

- Rules for application schemas and feature catalogues (11-20)

There are non-legally binding standards for conceptual data modelling of spatial information, on national (centralised), regional and provincial level, which cover LC, LU, US, AM, NR themes; they should become legally binding in a few months though. National standards regard conceptual data models for topographic databases, partially covering almost all INSPIRE Annex I and II themes. Another national standard is going to be issued regarding LC/LU. US, AM and NR are partially covered by specifications at regional or provincial level. This standards have not actually been applied, for the same reasons stated above under "Reference model"; they comply with ISO 19109.

- Data transformation (21-24)

Italy is not yet going to take care of data transformation between its own data specifications and the corresponding INSPIRE data specifications.

- Registers and registries (25-27)

There aren't examples of ISO 19135-compliant on-line registers of feature catalogues, application schemas, code lists, coordinate reference systems, units of measurements, external object identifier namespaces.

TDF

Latvia

- Reference model (2-10)

There are legally binding standards for the development of data specifications, on national (centralised) and regional level, not compliant with international standards. They haven't actually been applied, the respondent states that organisations in charge of control suffer from a lack of knowledge and software resources.

- Rules for application schemas and feature catalogues (11-20)

There are legally binding standards for conceptual data modelling of spatial information, on regional level, which cover LU, US, PF, NR themes. They have not actually been applied, since the work is almost started. No documentation about the standards has been provided.

- Data transformation (21-24)

Latvia is going to take care of data transformation between its own data specifications and the corresponding INSPIRE data specifications through a national (centralised) programme in progress.

- Registers and registries (25-27)

There aren't examples of ISO 19135-compliant on-line registers of feature catalogues, application schemas, code lists, coordinate reference systems, units of measurements, external object identifier namespaces.

ISOCARP

The Netherlands

- Reference model (2-10)

There are non-legally binding standards for the development of data specifications, on national (centralised) level. They have actually been applied, even if not legally binding: as a matter of fact they are adopted among public parties, and they comply with ISO 19100 standards.

- Rules for application schemas and feature catalogues (11-20)

There are legally binding standards for conceptual data modelling of spatial information, on national (centralised) level, which cover LU, US, AM, NR themes. They have actually been applied.
There are non-legally binding standards also, on national (centralised) level, which cover LC, AF, AM themes. They have actually been applied.

- Data transformation (21-24)

The Netherlands is going to take care of data transformation between its own data specifications and the corresponding INSPIRE data specifications through national (centralised) and regional programmes in progress.

- Registers and registries (25-27)

There aren't examples of ISO 19135-compliant on-line registers of feature catalogues, application schemas, code lists, coordinate reference systems, units of measurements, external object identifier namespaces, although the respondent states that the contents for some of the items listed above are going to be published on on-line registers.

DIPSU[1]

Spain

- Reference model (2-10)

There is a legally binding standard for the development of data specifications, on national (centralised) level. It has actually been applied, and it complies with ISO 19100 series. There are also non-legally binding standards at regional level, they have actually been applied also.

- Rules for application schemas and feature catalogues (11-20)

There aren't standards for conceptual data modelling of spatial information.

- Data transformation (21-24)

In Spain, on national (centralised) level, data transformation between local data specifications and the corresponding INSPIRE data specifications is going to be performed.

- Registers and registries (25-27)

No information has been provided about ISO 19135-compliant on-line registers of feature catalogues, application schemas, code lists, coordinate reference systems, units of measurements, external object identifier namespaces.

[1] During a workshop at the Italian National Geographic Institute in Rome on the 10th of November 2009, the Spanish National Geographic Institute (IGN) made a presentation of the Spanish "Land Cover and Use Information System" (SIOSE). SIOSE object-oriented conceptual data model appeared to be a very interesting European experience, so DIPSU asked to the representatives of IGN a contribution to task T4.1, and they accepted to answer to both sections of the questionnaire, the generic part about Spain and the specific part about their case study.

5. Analysis of case studies

This section illustrates the single results of the second part of the questionnaire, giving an overview of the compliance of the single case studies with the requirements and recommendations of the INSPIRE implementing rules.

5.1. Austria

Austria (CEIT) has provided one case study related to Land cover and Land use.

5.1.1 Land cover, Land use

The chosen case study is LISA (Land Information System of Austria).
In Austria, a group of experts are working on a standardised information and monitoring system and a national-wide data model for land use and land cover data. LISA has the aim to overcome differences in the spatial planning processes of the nine states. It is an object-oriented data model (composed of "simple" and "composed" objects). Compared to a hierarchical model (see Corine Land Cover), each object is not assigned to one thematic class but is additionally described by a database of descriptive parameters. The result is not a static cartographic description of the surface but a modelling in form of a database. The data model refers to the ISO 19109 standard and the INSPIRE "Generic Conceptual Model". The process started in May 2009.
The respondent has provided a link with more information on LISA:
http://www.landinformationsystem.at/tl_files/lisa/lisa/dokumente/Publikationen/GeoVille_ESA_LISA_final.pdf;
and to the project website:
http://www.landinformationsystem.at/index.php/index.html.
CEIT didn't have a direct involvement in the definition of this standard, but the respondent has consulted the experts who have developed it, who are also inclined to be involved in the future testing of the Plan4all Application Schemas.

AT-1	Austria	CEIT	LC/LU

"LISA - Land Information System"

http://www.landinformationsystem.at/tl_files/lisa/lisa/dokumente/Publikationen/GeoVille_ESA_LISA_final.pdf
http://www.landinformationsystem.at/index.php/index.html

- Strengths and weaknesses (3-4)

LISA is one data model for all nine Austrian States, being a first step towards harmonisation.
On the other hand, LISA is still in the process of being defined and has not been finished yet. So far the data model has been finalised (version 1.7) but still has to be evaluated by a team of scientific and technical experts.

- Terminology (8)

There is no standard glossary adopted.

- Reference model (9)

For the development of data specifications, a non-legally binding standard has been adopted. The standard is complying with ISO 19109 and INSPIRE.

- Rules for Application Schemas and Feature Catalogues (10-13)

UML has been adopted to express the Application Schema.
The software used for developing it is MS Visio.

- Spatial and temporal aspects (14-15)

There are rules to express spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
The code lists are multi-lingual (Req 47).

- Coordinate referencing and units of measurement model (18-19)

There are lists of coordinate and temporal reference systems that may be used in the encoding of spatial objects, as required by Reqs 51 and 54.

- Modelling object references (20)

Where possible, spatial objects are spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

Every spatial object type has a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications is in progress.

- Metadata (23-26)

Metadata elements are complying with ISO 19115, as required by Req 64.
There are metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are specified as part of the data specifications.
The possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are not provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65. At the moment, the experts are working on the LISA metadata schema; probably, also data quality elements and sub-elements will be provided with metadata in the future as long as this is necessary and the users will ask for it.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are consistent one to another, as recommended by Rec 28, with regard to the years covered by MOS.
The AS addresses the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69, with regard to the years covered by MOS.

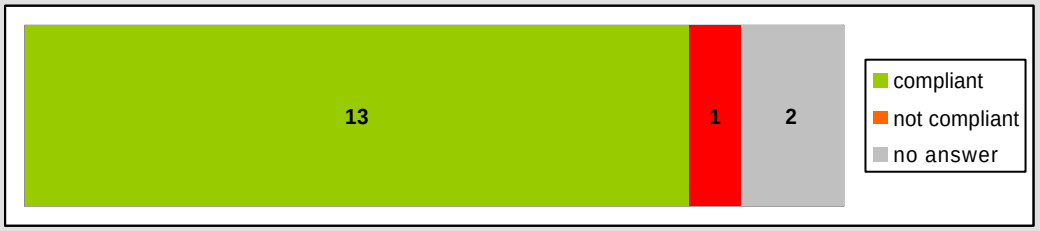
- Multiple representations (32-33)

There are two levels of detail defined per theme (Rec29).
No answer has been given about the requirement of multiple level per theme being justified and documented as part of the data specifications.

- Data capturing rules (34)

Capturing rules are specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



5.2. France

France (MEEDM) has provided the following case studies:

- 5 case studies related to Land cover (including CORINE Land Cover);
- 1 case study related to Land use;
- 2 case studies related to Utility and governmental services, Production and industrial facilities, Agriculture and aquaculture facilities, Area management/restriction/regulation zones and reporting units;
- 1 case study related to Natural risk zones.

5.2.1 Land cover

MEEDM has provided 5 case studies concerning the Land Cover theme:
- CORINE Land Cover;
- MOS (“Mode d’Occupation du Sol en Île de France”);
- LittoMOS, related to the coastal departments;
- OS-PACA, related to the PACA Region;
- OS Pays de Savoie, related to the Savoie Province.

As regards CORINE, MEEDM has chosen to describe it, despite its not being a country level study case, as it considered important to take it into account within the Land Cover discussion in the frame of Plan4all.
CORINE (Coordination of Information on the Environment) is a European programme initiated in 1985 by the European Commission, aimed at gathering information relating to the environment on certain priority topics for the European Union (air, water, soil, land cover, coastal erosion, biotopes, etc.). Since 1994, the European Environment Agency (EEA) integrated CORINE in its work programme. EEA is responsible for providing objective, timely and targeted information on Europe’s environment.
The respondent has provided a link to the EIONET website providing a definition of the CLC classes: http://etc-lusi.eionet.europa.eu/CLC2000/classes.
MEEDM didn’t have a direct involvement in the definition of this standard, but believes that it might be worth having some contacts with EEA in the frame of Plan4all.

As regards MOS, since 1982 it provides regular monitoring of the land cover over the Île de France Region. MOS (“Mode d’Occupation du Sol”) is the computerized atlas map of the land cover of the Île-de-France. Updated regularly since its first edition in 1982, the MOS can track and analyze in detail the evolution of land cover throughout the region. The first comprehensive inventory of land cover in Île-de-France was done in 1982. Since that date, MOS has been updated five times (1987, 1990, 1994, 1999 and 2003).
The respondent has provided a link to the publicly available interactive viewer: http://sigr.iau-idf.fr/webapps/visiau/. Also, there is a link to the website containing details of the procedure and of the contents: http://www.iaurif.org/basemos/index.php. A list of the classes is available at http://www.iaurif.org/basemos/liste.php.
The respondent compiled the questionnaire using information mainly taken from the Internet. However, the developer of this case study (IAURIF) might collaborate to the project through FNAU (“Fédération Nationale des Agences d’Urbanisme”), subcontractor of MEEDDM.

Litto_MOS is the land cover of the French coastal departments (2000-2006). The nomenclature for the new land cover database has been made from local land cover data (the update years spread between 2000 and 2006) after harmonisation with nomenclatures such as Corine Land Cover as a reference.
The respondent has provided the document “Nomenclature pour la nouvelle base de données de l'occupation du sol du littoral 2000-2006”, available at :
http://www.geolittoral.equipement.gouv.fr/IMG/pdf/Nomenclature_LittoMos_cle68478b.pdf;
and the following link:
http://www.geolittoral.equipement.gouv.fr/rubrique.php3?id_rubrique=68.
MEEDM had a direct role in the definition of this tool and is willing to be involved in the future testing of the Plan4all Application Schemas.

As regards OS-PACA, it is a database of regional land use, produced and distributed free of charge by the CRIGE PACA since 1999. The 2006 version has been published online in January 2008.

This database, consistent with the European nomenclature CORINE Land Cover (CLC), is one of the most downloaded from the CRIGE website. In order to take stock of these uses, the CRIGE held in September 2004 a survey of regional actors on CLC uses (more than 1000 persons). The answers highlighted the many uses and operations to which it is subject. They also highlighted the inadequacy of its capacity for detailed study and to respond to the urban scale.
The aim of OS-PACA is to enrich the CLC nomenclature with a 4th level and to increase the accuracy of the mapping thus obtained, with higher minimum mapping units compared to CORINE Land Cover.
This nomenclature has been tested in several areas of the PACA Region, as can be seen from example at:
http://www.crige-paca.org/frontblocks/donnees/select_LOT_DONNEES.asp
(OCSOLGEu_OHM de la Commune de Gardanne - 1998 et 2003).
The respondent has provided the document "Rapport final (Octobre 2006)" by the *Group de travail "Nomenclature urbaine - Occupation du sol grande échelle"* of the CRIGE-PACA.
The respondent compiled the questionnaire using information mainly taken from the Internet.

OS Pays de Savoie documents the actual land cover of the *Départements* of Savoie and Haute Savoie (NUTS III level).
The respondent has provided the document "Couche d'occupation réelle du sol des Pays de Savoie - Modélisation des données".
The respondent has compiled the questionnaire in collaboration with the developers of this case study, who are inclined to be involved in the future testing of the Plan4all Application Schemas.

FR-1	EU	MEEDM	LC

"CORINE Land Cover"

http://etc-lusi.eionet.europa.eu/CLC2000/classes

- Strengths and weaknesses (3-4)

CLC nomenclature is a European widely accepted standard. It is a hierarchical nomenclature composed of 3 levels. It is adopted by LMCS (Land Monitoring Core Services) in the context of GMES. It is also a nomenclature well documented in English. Besides, the concept of mapping land cover changes is interesting.
On the other hand, the choices made about scale (1:100.000), minimum mapping unit (MMU - 25 hectares) and minimum width of linear elements (100 metres) for CLC mapping has a negative impact on the level of detail of the nomenclature. Also, there is a questionable mixture of pure land cover feature classes with classes rather representing land use.

- Terminology (8)

No information provided about standard glossaries.

- Reference model (9)

No information provided about standards for the development of data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

No information provided about the conceptual schema language and software used.

- Spatial and temporal aspects (14-15)

There are rules to express spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
The code lists are multi-lingual (Req 47).

- Coordinate referencing and units of measurement model (18-19)

There are lists of coordinate and temporal reference systems that may be used in the encoding of spatial objects, as required by Reqs 51 and 54.

- Modelling object references (20)

Where possible, spatial objects are spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

As regards the matter of spatial object types having a property of type "Identifier" for the unique identification of spatial objects - as required by Req 58 -, the compliance with this requirement is considered unnecessary.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications is considered to be probably in progress, as EEA is involved in INSPIRE.

- Metadata (23-26)

Metadata elements are probably complying with ISO 19115, as required by Req 64, as EEA is involved in INSPIRE
There are no metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are specified as part of the data specifications.
The possible reasons for changes in spatial objects are documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements should be provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65. This is probable, as EEA is involved in INSPIRE.

- Consistency between data (30-31)

As regards the representations of multiple levels of detail being consistent one to another - as recommended by Rec 28 - , complying with this recommendation is considered unnecessary.
As regards the consistency between spatial data - as required by Req 69 -, complying with this requirement is considered unnecessary.

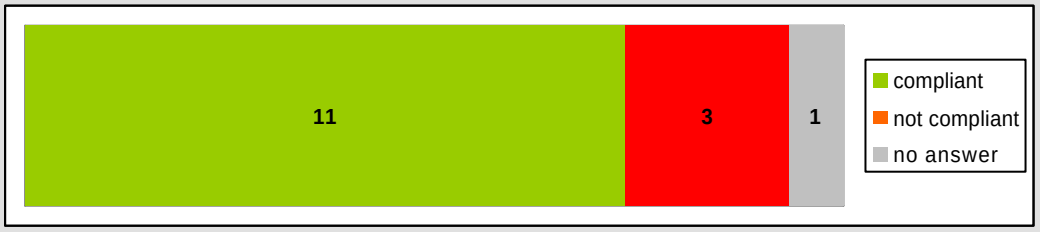
- Multiple representations (32-33)

There is one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



FR-2	France	MEEDM	LC

"MOS - Mode d'Occupation du Sol en Île de France"

http://sigr.iau-idf.fr/webapps/visiau/
http://www.iaurif.org/basemos/index.php
http://www.iaurif.org/basemos/liste.php

- Strengths and weaknesses (3-4)

MOS enables multi-temporal analysis as provides land cover information for 5 different years ranging from 1987 to 2003. Its structure enables to document the history of each land area that has a homogeneous land cover. When at a given date a previously homogeneous land area splits into several homogeneous land areas, the geometrical split of areas is propagated into all the previous land cover layers. The minimum mapping unit (MMU) is 0.03 ha. Moreover, an interactive viewer is available to the public (http://sigr.iau-idf.fr/webapps/visiau/).
On the other hand, it has to be said that MOS is only available in Île de France. Also, its nomenclature of 83 items is not really hierarchical, although a simplified level exists with 11 items.

- Terminology (8)

There is no standard glossary adopted.

- Reference model (9)

No standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

The nomenclature is accessible via the Internet as a php page.

- Spatial and temporal aspects (14-15)

There are rules to express spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
The code lists are not multi-lingual (Req 47), but this is considered unnecessary.

- Coordinate referencing and units of measurement model (18-19)

There are lists of coordinate and temporal reference systems that may be used in the encoding of spatial objects, as required by Reqs 51 and 54.

- Modelling object references (20)

Spatial objects are not spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16; this is considered unnecessary.

- Identifier management (21)

As regards the matter of spatial object types having a property of type "Identifier" for the unique identification of spatial objects - as required by Req 58 -, the compliance with this requirement is considered unnecessary.

- Data transformation (22)

There is no concern about data transformation from these data specifications to the corresponding INSPIRE data specifications.

- Metadata (23-26)

Metadata elements are complying with ISO 19115 - as required by Req 64 - as documented in www.geocatalogue.fr.

There are no metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are specified as part of the data specifications.
The possible reasons for changes in spatial objects are documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are consistent one to another, as recommended by Rec 28, with regard to the years covered by MOS.
The AS addresses the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69, with regard to the years covered by MOS.

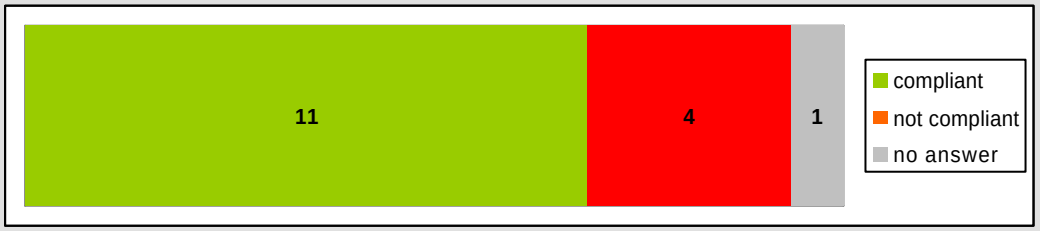
- Multiple representations (32-33)

There are five levels of detail defined per theme (Rec29).
In cases where multiple levels of detail per theme are required, this requirement is justified and documented as part of data specifications.

- Data capturing rules (34)

Capturing rules are specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



FR-3	France	MEEDM	LC

"Litto_MOS"

"*Nomenclature pour la nouvelle base de données de l'occupation du sol du littoral 2000-2006*" *(available at* *http://www.geolittoral.equipement.gouv.fr/IMG/pdf/Nomenclature_LittoMos_cle68478b.pdf)* *http://www.geolittoral.equipement.gouv.fr/rubrique.php3?id_rubrique=68*

- Strengths and weaknesses (3-4)

This project is a harmonisation procedure of local initiatives that produces land cover databases with a minimum mapping unit (MMU) ranging from 0.25 ha to 1 ha. It defines a 4th level into the CLC nomenclature, in order to take account of more detailed classes.
On the other hand, it has to be said that the resulting nomenclature is not a French common specification or standard; and that Litto_MOS only takes the coastal area into account.

- Terminology (8)

There is no standard glossary adopted.

- Reference model (9)

No standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

The nomenclature is just a 4 column spreadsheet, so there was no need to adopt any conceptual schema language nor to use any particular software.

- Spatial and temporal aspects (14-15)

There are rules to express spatial characteristics of spatial objects satisfying Req 36.
As for the temporal characteristics (Req 37), complying with this requirement is considered unnecessary.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
There is no need for the code lists to be multi-lingual (Req 47).

- Coordinate referencing and units of measurement model (18-19)

There are lists of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51.
As for the lists of temporal reference systems (Req 54), complying with this requirement is considered unnecessary.

- Modelling object references (20)

As for the matter of spatial objects being spatially or temporally referenced to existing spatial objects, rather than directly via coordinates - as recommended by Rec 16 -, the compliance with this recommendation is considered unnecessary.

- Identifier management (21)

As for the matter of spatial object types having a property of type "Identifier" for the unique identification of spatial objects - as required by Req 58 -, the compliance with this requirement is considered unnecessary.

- Data transformation (22)

There is no concern about data transformation from these data specifications to the corresponding INSPIRE data specifications.

- Metadata (23-26)

Metadata elements are complying with ISO 19115 - as required by Req 64 - as documented in www.geocatalogue.fr.
There are no metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are not specified as part of the data specifications.
The possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

As for the representations of multiple levels of detail being consistent one to another - as recommended by Rec 28 -, the compliance to this recommendation is considered unnecessary.
As for the consistency between spatial data - as required by Req 69 -, the compliance with this recommendation is considered unnecessary.

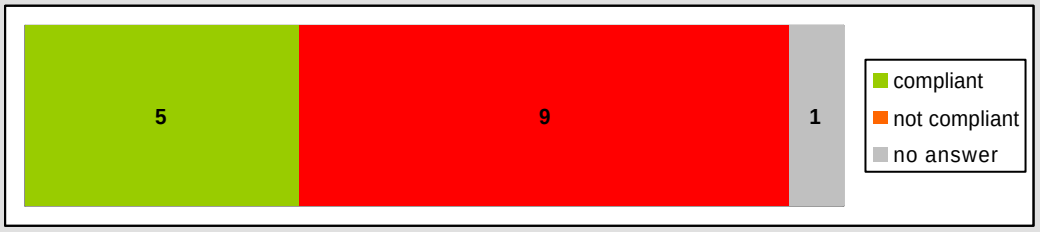
- Multiple representations (32-33)

There is one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are not specified for every spatial object type, in conformance with ISO 19131, as required by Req 73. This is considered unnecessary, as Litto_MOS is the result of a compilation of existing datasets.

Compliance with INSPIRE



FR-4	France	MEEDM	LC

"OS-PACA"

"Rapport final (Octobre 2006)" by the Group de travail "Nomenclature urbaine - Occupation du sol grande échelle*" of the CRIGE-PACA*

- Strengths and weaknesses (3-4)

The Minimum Mapping Unit (MMU) ranges from 0.25 to 1 ha, depending on the type of land cover. Combined with a wide input to 1/2,000, it allows the creation of databases allowing analysis of areas from municipal level (1/25,000) to the infra-municipal level within its surroundings (1/5,000), scale 1/10,000 being the most appropriate.
The proposed nomenclature follows the search for a balance between "desirable" - combining efficiency (state of all that is relevant) and economy (restricting itself to what is relevant) - and "practicable" - in terms of cost, time and technical resources mobilised for both the initial establishment of the database and its subsequent updates, at a rate sufficient to monitor and maintain the relevance of the database itself.
On the other hand, the resulting nomenclature is only representative of land cover classes in the mountainous and Mediterranean area.

- Terminology (8)

There is no standard glossary adopted.

- Reference model (9)

No standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

The nomenclature is accessible via the Internet as an asp page.

- Spatial and temporal aspects (14-15)

There are rules to express spatial characteristics of spatial objects satisfying Req 36.
As for the temporal characteristics (Req 37), complying with this requirement is considered unnecessary.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
There is no need for the code lists to be multi-lingual (Req 47).

- Coordinate referencing and units of measurement model (18-19)

There are lists of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51.
As for the lists of temporal reference systems (Req 54), complying with this requirement is considered unnecessary.

- Modelling object references (20)

As for the matter of spatial objects being spatially or temporally referenced to existing spatial objects, rather than directly via coordinates - as recommended by Rec 16 -, the compliance with this recommendation is considered unnecessary.

- Identifier management (21)

As for the matter of spatial object types having a property of type "Identifier" for the unique identification of spatial objects - as required by Req 58 -, the compliance with this requirement is considered unnecessary.

- Data transformation (22)

There is no concern about data transformation from these data specifications to the corresponding INSPIRE data specifications.

- Metadata (23-26)

Metadata elements are complying with ISO 19115 - as required by Req 64 - as documented in CRIGE-PACA geo-catalogue.
There are no metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are not specified as part of the data specifications.
The possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

As for the representations of multiple levels of detail being consistent one to another - as recommended by Rec 28 -, the compliance to this recommendation is considered unnecessary.
As for the consistency between spatial data - as required by Req 69 -, the compliance with this recommendation is considered unnecessary.

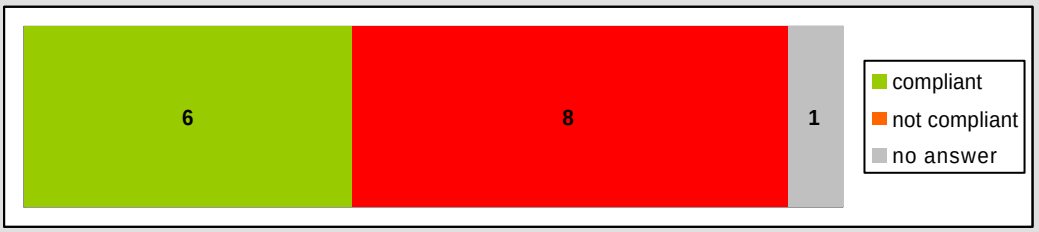
- Multiple representations (32-33)

There is one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



FR-5	France	MEEDM	LC

"OS-Pays de Savoie"

"Couche d'occupation réelle du sol des Pays de Savoie - Modélisation des données"

- Strengths and weaknesses (3-4)

This nomenclature applies to land cover in the mountainous Alpine area.
It is only used in the two departments that form the former Savoy Province (*Département 73 Savoie* and *Département 74 Haute Savoie*).

- Terminology (8)

There is no standard glossary adopted.

- Reference model (9)

No standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

The nomenclature is a pdf document, so there was no need to adopt any conceptual schema language nor to use any particular software.

- Spatial and temporal aspects (14-15)

There are rules to express spatial characteristics of spatial objects satisfying Req 36.
As for the temporal characteristics (Req 37), complying with this requirement is considered unnecessary.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
There is no need for the code lists to be multi-lingual (Req 47).

- Coordinate referencing and units of measurement model (18-19)

There is a *de facto* coordinate reference system in use which is the one available for France as a consequence of a decree defining the coordinate reference system to be used each time public funding is used.
As for the lists of temporal reference systems (Req 54), it is considered unnecessary.

- Modelling object references (20)

It is considered unnecessary to have spatial objects being spatially or temporally referenced to existing spatial objects, rather than directly via coordinates - as recommended by Rec 16.

- Identifier management (21)

As regards the matter of spatial object types having a property of type "Identifier" for the unique identification of spatial objects - as required by Req 58 -, the compliance with this requirement is considered unncecessary.

- Data transformation (22)

There is no concern about data transformation from these data specifications to the corresponding INSPIRE data specifications.

- Metadata (23-26)

Metadata elements are not complying with ISO 19115, as required by Req 64.
There are no metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are not specified as part of the data specifications.
The possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are not provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

As regards the representations of multiple levels of detail being consistent one to another - as recommended by Rec 28 -, the compliance with this recommendation is considered unnecessary.
The requirements on consistency between spatial data - as required by Req 69 - are considered unnecessary.

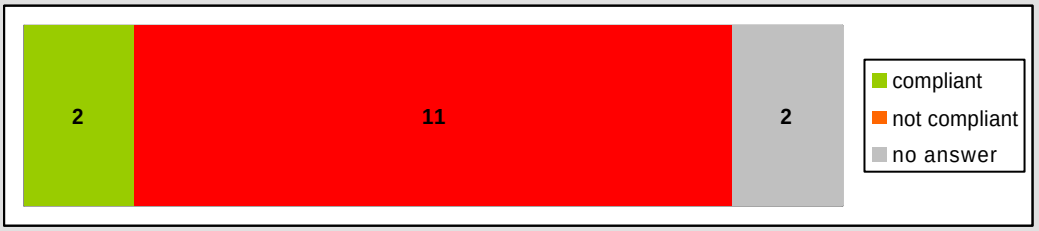
- Multiple representations (32-33)

There is one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are not specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



5.2.2 Land use

The chosen case study for Land use is the “Local spatial planning geodata standard”. This standard has been developed in view of providing a unique conceptual model for the graphical annexes of any local spatial planning documents produced by municipalities in France (*documents d'urbanisme* used as a generic term for *plan local d'urbanisme* and *carte communale*). It is a by-product of a more general work item leading to have these *documents d'urbanisme* in digital form.
The respondent has provided a document describing this standard (“Plan Local d’Urbanisme - Prescriptions nationales pour la livraison des documents d’urbanisme dématérialisés”).
MEEDM had a direct involvement in the definition of this standard.

FR-6	France	MEEDM	LU

“Local spatial planning geodata standard”

“Plan Local d’Urbanisme - Prescriptions nationales pour la livraison des documents d’urbanisme dématérialisés”

- Strengths and weaknesses (3-4)

This case study is a shared initiative combining the MEEDDM - as the ministry responsible for the law regarding spatial planning - several local governments in charge of producing *documents d'urbanisme*, several entities (central governments, local offices or local governments) in charge of turning existing *documents d'urbanisme* into digital form, and experts from both the geomatic side and the spatial planning side.
On the other hand, as it is in a final drafting process and although previous versions have been operationally tested, the proposed standard is not yet widely adopted. Nonetheless, it is expected it will be the reference model for most of the *documents d'urbanisme* that will be digitised or produced in digital form.

- Terminology (8)

The French “Code de l'urbanisme” provides a legally binding terminology in its articles R123-1 to R123-14.

- Reference model (9)

No standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

UML has been adopted for this standard. No information has been given regarding the software used for its development.

- Spatial and temporal aspects (14-15)

There are rules to express spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
The code lists are not multi-lingual (Req 47): this is considered unnecessary, as local spatial planning documents need to be read in conjunction with the *code de l'urbanisme*, therefore they require to master the French language.

- Coordinate referencing and units of measurement model (18-19)

There are lists of coordinate and temporal reference systems that may be used in the encoding of spatial objects, as required by Reqs 51 and 54.

- Modelling object references (20)

Where possible, spatial objects are spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

Every spatial object type has a property of type ”Identifier” for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications will be done as soon as the INSPIRE specifications will be mandatory.

- Metadata (23-26)

Metadata elements are complying with ISO 19115, as required by Req 64.
There are metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are specified as part of the data specifications.
The possible reasons for changes in spatial objects are documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are consistent one to another, as recommended by Rec 28.
The AS addresses the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69.

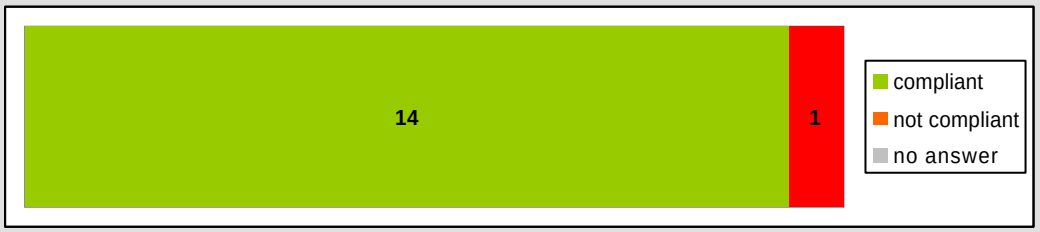
- Multiple representations (32-33)

There is one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



5.2.3 Utility and governmental services, Production and industrial facilities, Agriculture and aquaculture facilities, Area management/restriction/regulation zones and reporting units

MEEDM has provided 2 case studies concerning the themes US, PF, AF, AM:
- SUP;
- BD Topo.

The local development plans must contain the public utility constraints (known as SUP - *Servitude d'Utilité Publique*) affecting land use and contained in a list established by Order in Council of State.
In the context of the GeoSUP national application, a data model for SUP has been developed. The SUP in itself is a regulation zone as defined by the INSPIRE directive, but the geographical object that generates such constraints may be a utility, a governmental service, a production/industrial facility or an agriculture/aquaculture facility, or another type of geographic object.
The respondent has provided a document describing this standard ("Servitudes d'Utilité Publique - Structuration Des Données SUP (modèle conceptuel de données) dans le cadre d'un SIG").
MEEDM had a direct role in the definition of this tool and is willing to be involved in the future testing of the Plan4all Application Schemas.

As regards BD Topo, it provides to all players reliable information in 3D, which is useful to analyse, locate and represent any data type in their geographical context. The data base is produced by IGN (*Institute Géographique National*), the French mapping agency, as a component of the "Référentiel géographique à grande échelle" (RGE). It contains several object types that correspond to several INSPIRE themes. BDTopo contains the following themes:
- road network;
- railway network and cable-car network;
- transport of energy (INSPIRE theme);
- hydrograpic network;
- buildings (INSPIRE theme);
- vegetation;
- orography (contour lines);
- administrative units;
- activity areas (INSPIRE theme);
- geonames.

The respondent has provided a document describing this standard ("BD Topo Version 2 - Descriptif de contenu"); and the link:
http://professionnels.ign.fr/ficheProduitCMS.do?idDoc=5287265.
MEEDM didn't have a direct role in the definition of this tool; however, if required, IGN experts may be interviewed with the involvement of MEEDM staff.

FR-7	France	MEEDM	US/PF/AS/AM

"SUP"

"Servitudes d'Utilité Publique - Structuration Des Données SUP (modèle conceptuel de données) dans le cadre d'un SIG"

- Strengths and weaknesses (3-4)

This case study provides elements for the regulation zones as defined by the French law "Code de l'urbanisme". It provides a useful example of a link among several INSPIRE themes, with an interesting view from the planning perspective (constraints that affect the use of land).
On the other hand, the case study only partially covers the INSPIRE themes and is specific to the French situation.

- Terminology (8)

The "Code de l'urbanisme" provides a legally binding terminology in its articles R126-1 annex, modified by Décret n° 2007-1557 of 2 Nov. 2007, art. 72, JORF 3 Nov. 2007.

- Reference model (9)

No standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

The case study can be translated into UML if required.

- Spatial and temporal aspects (14-15)

There are rules to express spatial characteristics of spatial objects satisfying Req 36.
As for the temporal characteristics (Req 37), these have not been taken into consideration.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
The code lists are not multi-lingual (Req 47): this is considered unnecessary, as the local spatial planning documents need to be read in conjunction with the "Code de l'urbanisme" and require to master the French language.

- Coordinate referencing and units of measurement model (18-19)

There are lists of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51.
As for the lists of temporal reference systems (Req 54), it has not been taken into consideration.

- Modelling object references (20)

Where possible, spatial objects are spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

Every spatial object type has a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications will be done as soon as the INSPIRE specifications will be mandatory.

- Metadata (23-26)

Metadata elements are not complying with ISO 19115, as required by Req 64; it is considered unnecessary.
There are no metadata schemas integrated into the AS.

Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are not specified as part of the data specifications.

- Data and information quality (29)

Data quality elements and sub-elements are not provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

As regards the representations of multiple levels of detail being consistent one to another - as recommended by Rec 28 - the compliance with this recommendation is considered unnecessary.
The requirements on consistency between spatial data - as required by Req 69 - are considered unnecessary.

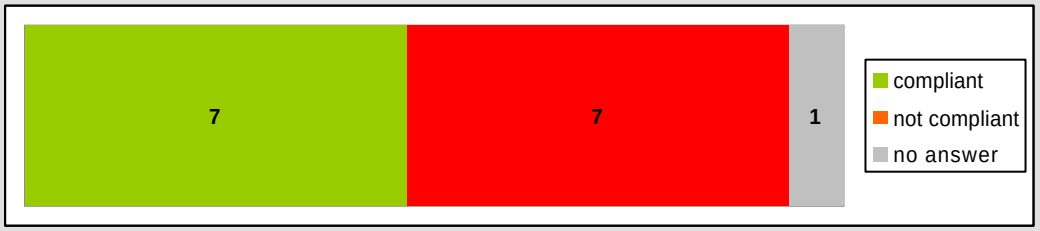
- Multiple representations (32-33)

There is one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



FR-8	France	MEEDM	US/PF/AS/AM

"BD Topo"

"BD Topo Version 2 - Descriptif de contenu"
http://professionnels.ign.fr/ficheProduitCMS.do?idDoc=5287265

- Strengths and weaknesses (3-4)

This case study proposes a highly structured data model for several layers, together with links among objects that share the same geometry. It is unique for the entire French country and is in the process of consolidating with other country products in the context of EuroGeographics.
On the other hand, this case study only partially covers the INSPIRE selected themes, and is specific to the French situation.

- Terminology (8)

There is no standard glossary adopted.

- Reference model (9)

For developing these data specifications, a national standard has been adopted (IGN methodology).

- Rules for Application Schemas and Feature Catalogues (10-13)

The conceptual schema language adopted is UML.

- Spatial and temporal aspects (14-15)

There are rules to express spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
The code lists are not multi-lingual (Req 47): the documentation is only available in French.

- Coordinate referencing and units of measurement model (18-19)

There are lists of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51.
As for the lists of temporal reference systems (Req 54), it has not been taken into consideration.

- Modelling object references (20)

Where possible, spatial objects are spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

Every spatial object type has a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications will be done as soon as the INSPIRE specifications will be mandatory.

- Metadata (23-26)

Metadata elements are complying with ISO 19115, as required by Req 64.
There are metadata schemas integrated into the AS.

- Maintenance (27-28)

Maintenance procedures are specified as part of the data specifications.

Possible reasons for changes in spatial objects are documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are consistent one to another, as recommended by Rec 28.
The AS addresses the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69.

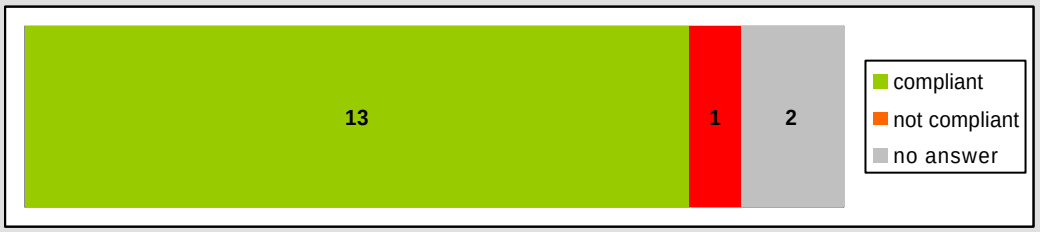
- Multiple representations (32-33)

There is one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



5.2.4 Natural risk zones

In France, the citizen is entitled to information about major risks (Article L125-2 of the Environmental Code). At the same time, this information is difficult to find.
The Department of Ecology, Development and Sustainable Management decided to make accessible hazard maps on the Internet. All the maps on natural hazards and technological disasters (including PPR) are available for the inhabitants but also for all professionals: insurers, lawyers, planners, etc. This service is called "Cartorisque".
The respondent has provided a document describing this standard ("CARTORISQUE: spécifications de normalisation"); and the link:
http://www.prim.net/professionnel/cartographie/cartorisque_pratique.html#PPRN.
If required, experts from the Ministry, who have been involved in the elaboration of this service, may be interviewed and possibly involved in the future testing of Plan4all Application Schemas.

FR-9	France	MEEDM	NR

"Cartorisque"

"Cartorisque: spécifications de normalisation"
http://www.prim.net/professionnel/cartographie/cartorisque_pratique.html#PPRN

- Strengths and weaknesses (3-4)

This case study proposes a national set of specifications and conceptual model in use at all levels of government. It provides also an example of thematic SDI using WMS possibilities. Moreover, it models both the procedure and the result of the procedure.
On the other hand, the conceptual data model used is very much software dependent, as it is linked to MapInfo and MapServer technologies. Also, all documentation is in French.

- Terminology (8)

There is no standard glossary adopted.

- Reference model (9)

No standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

The case study can be translated into UML if required.

- Spatial and temporal aspects (14-15)

No information provided.

- Multi-lingual text and cultural adaptability (16-17)

No information provided.

- Coordinate referencing and units of measurement model (18-19)

There are lists of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51.
As for the lists of temporal reference systems (Req 54), it has not been taken into consideration.

- Modelling object references (20)

Where possible, spatial objects are spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

Every spatial object type has a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications will be done as soon as the INSPIRE specifications will be mandatory.

- Metadata (23-26)

Metadata elements are complying with ISO 19115, as required by Req 64.
There are metadata schemas integrated into the AS.
As for the question about metadata types from ISO 19115 having been extended, this has not been considered necessary.

- Maintenance (27-28)

Maintenance procedures are not specified as part of the data specifications.
Possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

As regards the representations of multiple levels of detail being consistent one to another - as recommended by Rec 28 -, the compliance with this recommendation is considered unnecessary.
The requirements on consistency between spatial data - as required by Req 69 - are considered unnecessary.

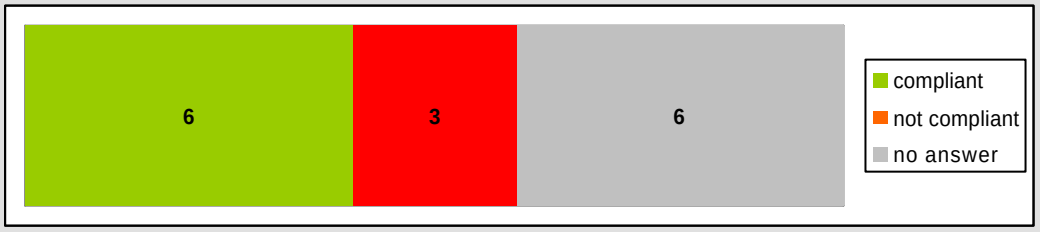
- Multiple representations (32-33)

There is one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



5.3. Germany

Germany (LGV Hamburg) has provided the following case studies:
- 1 case study related to Land cover;
- 1 case study related to Land use;
- 1 case study related to Agriculture and aquaculture facilities.

5.3.1 Land cover

The chosen case study for Land cover is the Official Topographic and Cartographic Information System of the German state survey ("ATKIS"). It describes the landscape with various application objectives in the following product groups:
- digital landscape models (ATKIS-DLM);
- digital terrain models (DGM);
- digital topographic maps (DTK);
- analogue extracts from the digital topographic maps (DTK).

The respondent has provided a document describing this standard ("ATKIS - Official Topographic and Cartographic Information System of the German state survey"); and the link:
http://www.adv-online.de/icc/extdeu/broker.jsp?uCon=68470b36-de06-8a01-e1f3-351ec0023010&uBasVariantCon=11111111-1111-1111-1111-111111111111.
The respondent has not filled in the questionnaire for this case study.

DE-1	Germany	LGV Hamburg	LC
"ATKIS - Official Topographic and Cartographic Information System of the German state survey"			
"Documentation on the Modelling of Geoinformation of Official Surveying and Mapping - Section 5.4" *http://www.adv-online.de/icc/extdeu/broker.jsp?uCon=68470b36-de06-8a01-e1f3-351ec0023010&uBasVariantCon=11111111-1111-1111-1111-111111111111*			

5.3.2 Land use

The chosen case study for Land use is "XPlanung" (*Standardisiertes Datenmodell für Bauleitpläne*).
XPlanung belongs to Germany's national e-government strategy pursued by the federal government, federal-state governments and municipal administrations "Deutschland-Online". XPlanung is part of the "Deutschland-Online Project Geographic Data", corresponding to German planning law standardised data models and data-exchange format (XPlanGML) for:

- comprehensive regional planning at federal, federal state and county level (based on framework law "Federal Spatial Planning Act");
- preparatory land-use plan, binding land-use plan, project and infrastructure plan (based on "Federal Building Code");
- landscape programmes, landscape master plans, landscape plans (based on framework law "Federal Nature Conservation Act").

LGV is involved in modelling the XPlanung data model for spatial planning in Germany, and is inclined to be involved in the future testing of the Plan4all application schemas. The respondent has provided the XPlanung GML application schema; and the link: http://www.iai.fzk.de/www-extern/index.php?id=680.

DE-2	Germany	LGV Hamburg	LU

"XPlanung - Standardisiertes Datenmodell für Bauleitpläne"

"XPlanung GML"
http://www.iai.fzk.de/www-extern/index.php?id=680

- Terminology (8)

A legally binding standard glossary has been adopted.

- Reference model (9)

A non-legally binding standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

UML 1.3 has been used to develop this case study.
The software used is Rational Rose, version 2003.

- Spatial and temporal aspects (14-15)

There are rules to express spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
The code lists are not multi-lingual (Req 47): this is considered unnecessary, as until now XPlanGML only has been standardised according to German planning law data models and data-exchange format (XPlanGML).

- Coordinate referencing and units of measurement model (18-19)

There is no list of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51.
There is no list of temporal reference systems that may be used in the encoding of spatial objects, as required by Req 54.

- Modelling object references (20)

Where possible, spatial objects are spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

Every spatial object type has a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications is currently in progress.

- Metadata (23-26)

Metadata elements are not complying with ISO 19115, as required by Req 64. The XPlanung working group hasn't defined metadata elements until now. Some metadata elements are defined in general XPlanGML classes (e.g. XP_Plan, BP_Plan or FPlan: planName, planNumber, planType, legalSituation, planPreparationDecisionDate, etc.). After a metadata profile for the INSPIRE theme "Land use" will be defined, the German XPlanung working group will adopt this definition.
There are no metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are not specified as part of the data specifications.
Possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are not provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65. The XPlanung working group hasn't defined metadata elements until now.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are not necessarily consistent one to another, as recommended by Rec 28.

- Multiple representations (32-33)

There is one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE

5.3.3 Agricultural and aquaculture facilities

The chosen case study for Agricultural and aquaculture facilities is “agroXML”.
The respondent has provided the “Agro XML” schema; and the link:
http://www.agroxml.de/index.php.
The respondent has not filled in the questionnaire for this case study.

DE-3	Germany	LGV Hamburg	AF
“agroXML”			
“Agro XML” *http://www.agroxml.de/index.php*			

5.4. Ireland

Ireland (MAC) has provided the following case studies:
- 1 case study related to Land cover, Land use, Utility and governmental services, Production and industrial facilities, Area management/restriction/regulation zones and reporting units;
- 1 case study related to Land use and Utility and governmental services.

The former is a national level example, the latter is related to local spatial planning.

5.4.1 Land cover, Land use, Utility and governmental services, Production and industrial facilities, Area management/restriction/regulation zones and reporting units

The Irish Spatial Data Exchange (ISDE) online data portal (information on numerous environmental, geological and related government agencies) is a Department of Communications, Energy and Natural Resources initiative, in which the Marine Institute acted as the lead partner for the project. ISDE operates as an interdepartmental and cross agency online service allowing the public to search multiple databases. ISDE enables searching of meta-data catalogues operated by each of the partner organisations involved in it. This can be done either using the ISDE search page, or by selecting the global option on the individual catalogue search pages from any of the partners' websites. The exchange architecture is distributed with a light central mediation service.
ISDE plans to become the Irish National INSPIRE Geo-Portal. If this happens, according to the respondent it will be the key Plan4all case study in Ireland.
ISDE is described and is accessible at www.isde.ie.
MAC has not had any direct involvement in the development of the case study provided, although the respondent has compiled the questionnaire in collaboration with its developers.

IE-1	Ireland	MAC	LC/LU/US/PF/AM

"ISDE - Irish Spatial Data Exchange"

www.isde.ie

- Strengths and weaknesses (3-4)

The exchange is based around OGC and ISO standards (it is ISO 19115 compliant) which allows it to be independent of any catalogue implementation technologies, and it is evolving towards full INSPIRE compliance, and hopes to become the Irish National Geo-Portal.
It is currently stalled in its evolution towards INSPIRE Compliance due to lack of funding.

- Terminology (8)

The terminology is currently based on OGC/ISO terminology, but will evolve towards that of INSPIRE.

- Reference model (9)

None, though the system is based on OGC/ISO recommendations, but aims to evolve towards those recommended by INSPIRE.

- Rules for Application Schemas and Feature Catalogues (10-13)

No answer has been provided about the adopted conceptual schema language.
As regards the software, for the distributed ISDE architecture a simplified version of the Reach Public Service Broker protocols (ReachLite) was implemented. This "lite" implementation of protocols circumvented the more complex requirements for a complete hub-and-spoke implementation. The solution included:

- Web Browser (Requester) – The user of the service via the host application server
- Web Server (Application Host) – The Enabler that manages the web services and accepts HTTP requests and augments and routes the message appropriately
- ReachLite (Fulfiller) – The provider of the service functionality based on a partial implementation of the Reach Public Service Broker interface standards.

The ReachLite Fulfiller was designed with software components to work both in a Microsoft and Open Source environments. The ISDE solution demonstrates the value of data exchange within the public services sector as a whole. It provides immediate practical assistance to those agencies and organisations and individuals that require an Irish nation wide-view of the available data.

- Spatial and temporal aspects (14-15)

There are no rules to express spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37.

- Multi-lingual text and cultural adaptability (16-17)

Code lists and enumerations are not used, as recommended by Rec 12. The developer has conformed to standards that don't manage this issue.

- Coordinate referencing and units of measurement model (18-19)

There are no lists of coordinate and temporal reference systems that may be used in the encoding of spatial objects, as required by Reqs 51 and 54. The developer has conformed to standards that don't manage this issue.

- Modelling object references (20)

Spatial objects are not spatially or temporally referenced to existing spatial objects, as recommended by Rec 16. The developer has conformed to standards that don't manage this issue.

- Identifier management (21)

The spatial object types don't have a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58. The developer has conformed to standards that don't manage

this issue.

- Data transformation (22)

Data transformation from these data specifications to the corresponding INSPIRE data specifications are currently in progress.

- Metadata (23-26)

Metadata elements are complying with ISO 19115, as required by Req 64.
There are metadata schemas integrated into the AS.
Metadata types from ISO 19115 have been extended. The extensions are not complying with ISO 19109 and 19115, as the developer has conformed to standards that don't manage this issue.

- Maintenance (27-28)

Maintenance procedures are specified as part of the data specifications.
The possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are not provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65. The developer has conformed to standards that don't manage this issue.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are not necessarily consistent one to another, as recommended by Rec 28; neither does the AS address the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69. The developer has conformed to standards that don't manage these issues.

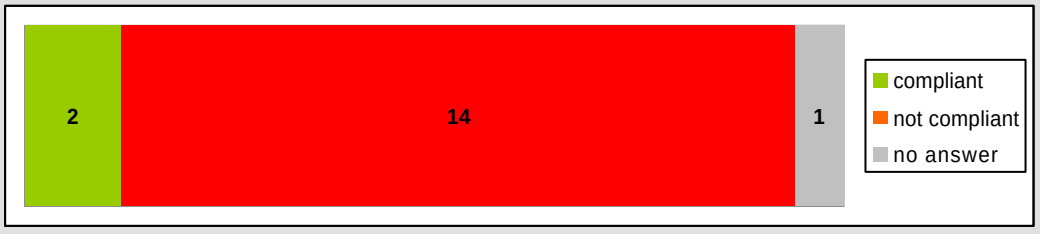
- Multiple representations (32-33)

There are various levels of detail defined per theme (Rec29). Given its distributed nature and many data sources, the ISDE has many types of information (the spatial object type and its properties), many selection rules (explaining which entities of the real world are represented in the data set) and accuracy of the attributes. As well as varying semantic granularity, types of geometries (3D, 2.5D, or 2D; volume, surface, curve or point) and accuracy of the geometries.
The requirement about multiple levels of detail per theme is not justified and documented as part of the data specifications.

- Data capturing rules (34)

Capturing rules are not specified for every spatial object type, in conformance with ISO 19131, as required by Req 73. The developer has conformed to standards that don't manage these issues.

Compliance with INSPIRE



5.4.2 Land use / Utility and governmental services

The chosen case study is the "ePlan Local Planning System". This case study describes the ePlan spatial planning applications tracking system from the Irish Local Government Management Agency (LGMA – www.lgma.ie) that is used by most Planning Authorities in Ireland to administer and provide public web access to the local spatial planning applications process in Ireland. ePlan is a web-based Planning Application tracking facility, that allows members of the public easy access to information on the status of planning applications and to interrogate the planning files for a number of planning authorities simultaneously. It provides a "graphical" depiction of the progress of the applications from receipt to determination. It is based on the database of each Planning Authority's iPlan (internal Planning Application Administration system) which is used to process and monitor planning applications through the different stages of the planning process. iPlan is also provided and maintained by the LGMA, but each Planning Authority's iPlan database is held locally and maintained by the Authority. The iPlan database contains the Planning Authority's data on the planning applications process only and very little on the "forward planning" of County and Local Development plans and zoning regulations.

Two Planning Authorities were interviewed for this case study:

- Donegal County Council (DCC) which is the Planning Authority for County Donegal in Ireland (www.donegalcoco.ie), and
- Limerick County Council (LCC) which is the Planning Authority for County Limerick (www.limerickcoco.ie).

The development of any land in Ireland requires planning permission unless the development is specifically exempt from the need for permission. Development means "the carrying out of any works on, in or under land or the making of any material change in the use of any structure or other land". Therefore an application has to be made to the local planning authority (DCC in county Donegal, LCC in county Limerick) to apply for planning permission for the following forms of development:

- developing any land including erecting any structure on it;
- changing the use of any land or structure;
- retaining any unauthorised structure;
- continuing any unauthorised use of land or structure.

In order to be successful, an application must be able to satisfy both the Authority and other interested persons that the development;

- will be in accordance with the proper planning and sustainable development of the area;
- will be in accordance with any Development Plans the Local Authority have made for the area;
- will not be harmful to owners or occupiers of property affected by it;
- will not be harmful to the general public.

DCC and LCC hold the following data that is relevant to 2 of the 7 Plan4all spatial planning themes:

- Land use: current and future planned functional or socio-economic land uses, including Development Plan, Local Area Plans, Strategic Development Zones and Planning Registers;
- Utility and governmental services: utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals,

but also under other themes listed in the INSPIRE Annexes.

The respondent has provided the tables and diagram representing the iPlan structure; and the links to the ePlan system
(www.donegal.ie/dcc/eplan/

and
www.lcc.ie/ePlan/InternetEnquiry/rpt_QueryBySurForRecLoc.asp)
and to the “Online Planning Services Good Practice Transfer Guide"
(www.pike-project.eu/Filer/Online%20planning%20services_eng_k2.pdf).
MAC has not had any direct involvement in the development of the case study provided, although the respondent has compiled the questionnaire in collaboration with its developers.

IE-2	Ireland	MAC	LU/US

"ePlan Local Planning System"

"iPlan Dasebase Table Layouts"
iPlan entity-relationships diagram
www.donegal.ie/dcc/eplan/
www.lcc.ie/ePlan/InternetEnquiry/rpt_QueryBySurForRecLoc.asp

- Strengths and weaknesses (3-4)

While the Law governing the Irish planning system is set out in the Local Government (Planning & Development) Acts, 2000-2006 and Local Government (Planning & Development) Regulations, 2001 to 2007, the actual day-to-day on-the-ground spatial planning and implementation process is carried out by the Local Planning Authorities. Donegal and Limerick County Councils are such Local Planning Authority that are making good use of ICT, and open standards. They both use the LGMA iPlan Planning Administration System and ePlan web-based planning enquiry system.
Nevertheless, while each of the Local Planning Authorities operate within the National Legislation in Ireland, and most use the ePlan and iPlan systems, their procedures have evolved individually. So there is a lack of interoperability and harmonisation between regions and counties. Also, while all Local Authorities that use the LGMA planning systems, use the ePlan data elements, they individually choose the specific definition of many elements within the iPlan database, to meet their own specific requirements. So there is no common standards, glossary or metadata.

Both Donegal and Limerick County Councils are actively working to understand and meet their INSPIRE compliance responsibilities in all of their GI including spatial planning and its implementation, but it is not yet clear what this will involve or when it can be achieved. At a national level, the Irish INSPIRE Task Force is working to develop a Guide Book to help all Irish Public Agencies (including the Planning Authorities) to meet their INSPIRE responsibilities, but this is probably some way off yet. No budget has been allocated by the Irish Government to achieve INSPIRE compliance in Ireland, so Agencies have to work within their operational budgets, and these have been reduced due to economic circumstances. In addition, for the 88 Irish Planning Authorities, a representative group of GIS Officers will probably need to be formed to come up with a common coherent approach to achieving INSPIRE compliance in the Irish Planning Authorities. So this is even a longer way off.

- Terminology (8)

No standard glossary, containing general terms and definitions regarding geographic information and spatial data planning, has been adopted.

- Reference model (9)

No standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

No conceptual schema language has been yet adopted.
Both DCC and LCC use the LGCSB iPlan Planning Applications Administration system, and ePlan web-based planning application tracking system (which has common data elements for all Local Authorities that use the LGMA system and each Council chooses to use elements of its iPlan database as it sees fit and applicable to its specific needs).
The LGMA Spatial Planning systems are:

- iPlan: a Planning Application Administration system used to process and monitor planning applications through the different stages of the planning process. This and its database are internal and private within each Planning Authority;
- ePlan: a web-based Planning Application tracking facility, that allows members of the public easy access to information on the status of planning applications and to interrogate the planning files for a number of planning authorities simultaneously, provides a "graphical" depiction of the progress of the applications from receipt to determination. The ePlan data is public and common across the Planning Authorities that use it, so it provides perhaps the best first step towards

common INSPIRE-compliant standards and metadata in this area.

- Spatial and temporal aspects (14-15)

There are no rules to express spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37. These are considered unnecessary, as the Councils are currently rather focused on meeting their local spatial planning implementation responsibilities under Irish Planning Law.

- Multi-lingual text and cultural adaptability (16-17)

Code lists and enumerations are not used, as recommended by Rec 12. This is considered unnecessary, as the Councils are currently rather focused on meeting their local spatial planning implementation responsibilities under Irish Planning Law.

- Coordinate referencing and units of measurement model (18-19)

There are no lists of coordinate and temporal reference systems that may be used in the encoding of spatial objects, as required by Reqs 51 and 54.

- Modelling object references (20)

Spatial objects are not spatially or temporally referenced to existing spatial objects, as recommended by Rec 16. This is considered unnecessary, as the Councils are currently rather focused on meeting their local spatial planning implementation responsibilities under Irish Planning Law.

- Identifier management (21)

The spatial object types don't have a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58. This is considered unnecessary, as the Councils use the features as provided in the iPlan & ePlan systems, but suited to their individual needs rather than in a common standards-based approach.

- Data transformation (22)

Data transformation from these data specifications to the corresponding INSPIRE data specifications will not be taken care of.

- Metadata (23-26)

Metadata elements are not complying with ISO 19115, as required by Req 64. This is considered unnecessary, as the Councils are focused on meeting their local planning responsibilities under Irish Planning Law. The ePlan system, and the iPlan database that it uses, are based on datasets developed by the LGMA to enable Planning Authorities to meet their planning applications and administration duties, and many data elements are used in individual ways within each Council, to meet their specific needs.
There are no metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are specified as part of the data specifications.
The possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are not provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65. This is considered unnecessary, as each Council is focused on meeting its local planning responsibilities under Irish Planning Law. See also under "Metadata".

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are not necessarily consistent one to another, as recommended by Rec 28; neither does the AS address the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required

by Req 69. This is considered unnecessary, as each Council is focused on meeting its specific local planning responsibilities under Irish Planning Law, and these do not include requiring these kinds of consistencies.

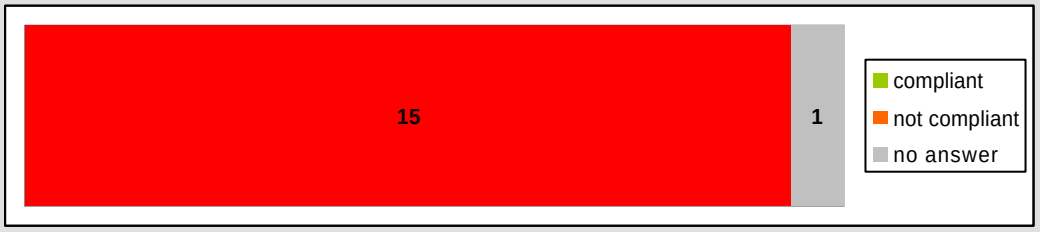
- Multiple representations (32-33)

There are various levels of detail defined per theme (Rec29), but all related to local spatial planning and implementation within each individual County.
Given its fragmented nature and multiple legal objectives, the DCC and LCC Spatial Planning systems, which include ePlan/iPlan, but also their various County Development Plans, Local Area Plans, Development Zones, Planning Registers and Planning Enforcement, have many types of information (the spatial object type and its properties), many selection rules (explaining which entities of the real world are represented in the data set) and accuracy of the attributes. As well as varying semantic granularity, types of geometries (3D, 2.5D, or 2D; volume, surface, curve or point) and accuracy of the geometries. Much of the County Development and Local Area, Strategic Development Zone plans and Planning Registers are on paper (and PDF files), and are only manually related to the Planning Applications Administration and Enforcement data through zoning and other local constraint requirements.
The requirement about multiple levels of detail per theme is not justified and documented as part of data specifications

- Data capturing rules (34)

Capturing rules are not specified for every spatial object type, in conformance with ISO 19131, as required by Req 73. This is considered unnecessary, as each Council is focusing on its own specific county's requirements and just uses the ePlan and iPlan systems as they are.

Compliance with INSPIRE



5.5. Italy

Italy has provided the following case studies:
- 1 case study related to Land cover;
- 1 case study related to Land use, together with Area management/restriction/regulation zones and reporting units, and Natural risk zones;
- 1 case study related to Area management/restriction/regulation zones and reporting units.

The first and the third case studies are from a regional level, the second one is an example of provincial level, related to local spatial planning.

5.5.1 Land cover

The Lazio Region is in the process of officially adopting the logical model of its topographic database (DBT). DIPSU has chosen this case study because, even if it is a topographic model, it contains many entities describing the land cover and is therefore partially overlapping with the Land cover theme.

The Region participated with other Italian Regions in the development of the AS that currently is the national (not legally binding) standard for spatial data representation. The model presented here is an adaptation of these national specifications to the specific needs of the Region; this adaptation has been made in order to meet the Region's needs in terms of data. Anyhow, this model doesn't have to be considered definitive, since the national definition of a data model is still in progress. Therefore, it could be modified according to the definitive decisions adopted at national level.

DIPSU didn't have a role in developing these data specifications; the questionnaire has been filled in by the Lazio Region, which is also inclined to be involved in the future testing of the Plan4all Application Schemas.

The Region is interested in testing the Application Schema developed by Plan4all, in order to assess its actual effectiveness on its own platform. In case of success, the Region could report the results to CNIPA (National Committee for the use of IT in the Public Administrations).

IT-1	Italy	DIPSU	LC
"DBT Regione Lazio"			

- Strengths and weaknesses (3-4)

This model has been adopted as a standard by the Lazio Region for the physical implementation of the topographic database. The architecture of the model has been built starting from the INSPIRE Guidelines. The model matches and develops the core standard setup by the Italian National Committee for the Information Technologies in the Public Administration (CNIPA). There is a high level of definition of the topics and of description of data; and a hierarchical structure of the data objects. Also, the high level of hierarchical organisation allows for a multi-scale description and a wide range of possible purposes.
On the other hand, it has to be said that the structure is very analytical and detailed, it requires a high level of knowledge and a high quality in the data input.

- Terminology (8)

The national glossary developed by CNIPA has been used after being enriched with new entries.

- Reference model (9)

The ISO 19101 standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

Simple text language, with an alphanumeric code for describing the hierarchy, has been adopted to express this standard.
No specific software was used for developing it: the model is expressed in alphanumeric language and has been elaborated with a standard word processor.

- Spatial and temporal aspects (14-15)

There are rules to express spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37.

- Multi-lingual text and cultural adaptability (16-17)

Code lists and enumerations are used whenever possible, as recommended by Rec 12.
The code lists are not multi-lingual (Req 47). They are expressed in acronyms referring to Italian terms.

- Coordinate referencing and units of measurement model (18-19)

There is no list of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51. The CNIPA Committee will issue a decree standardising the use of coordinate reference system at National Level.
There is a list of temporal reference systems that may be used in the encoding of spatial objects, as required by Req 54.

- Modelling object references (20)

Spatial objects are not spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

Every spatial object type has a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications has not been taken care of.

- Metadata (23-26)

Metadata elements are complying with ISO 19115, as required by Req 64.
There aren't metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are specified as part of the data specifications.
The possible reasons for changes in spatial objects are documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are consistent one to another, as recommended by Rec 28.
The AS addresses the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69.

- Multiple representations (32-33)

There is just one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are not specified for every spatial object type, in conformance with ISO 19131, as required by Req 73. This issue has not been considered.

Compliance with INSPIRE

5.5.2 Land use, Area management/restriction/regulation zones and reporting units, Natural risk zones

The chosen case study is the Mosaic of the urban master plans of the Province of Bologna. The Province is building a mosaic of all the urban Master Plans in order to monitor the urbanisation and the land use transformation in its territory.
The respondent has provided a document describing this standard ("Modello dati di base del Piano Strutturale Comunale per il territorio provinciale bolognese").
DIPSU didn't have a role in developing these data specifications; the questionnaire has been filled in by the Province of Bologna, which nevertheless is not inclined to be involved in the future testing of the Plan4all Application Schemas.

IT-2	Italy	DIPSU	LU/AM/NR

"Mosaic of the urban master plans of the Province of Bologna"

"Modello dati di base del Piano Strutturale Comunale per il territorio provinciale bolognese"

- Strengths and weaknesses (3-4)

From a town planner's point of view, this is the most important database, and from the point of view of GIS it is an interesting application because the same data is shared among different public administrations.

- Terminology (8)

A regional standard glossary has been adopted.

- Reference model (9)

A regional standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

XML has been adopted to express this standard.
DBDesigner and ArcGis Diagrammer have been used for its development.

- Spatial and temporal aspects (14-15)

There are no rules to express spatial characteristics of spatial objects satisfying Req 36. This is due to a weakness in the software.
There are no rules to express temporal characteristics of spatial objects satisfying Req 37. This issue has not been managed.

- Multi-lingual text and cultural adaptability (16-17)

The code lists are not multi-lingual (Req 47), as the compliance with the standard used doesn't manage this issue.

- Coordinate referencing and units of measurement model (18-19)

There is a list of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51.
There is no list of temporal reference systems that may be used in the encoding of spatial objects, as required by Req 54. The compliance with the standard used doesn't manage this issue.

- Modelling object references (20)

Where possible, spatial objects are spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

Every spatial object type has a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications will not be taken care of.

- Metadata (23-26)

Metadata elements are not complying with ISO 19115, as required by Req 64. The developers have started producing metadata before ISO 19115, and at the moment the Province doesn't have the necessary resources to become compliant with it.
There aren't metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are not specified as part of the data specifications.
The possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are not provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65. The case study is anyhow compliant with CENTTC 286.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are not necessarily consistent one to another, as recommended by Rec 28. The compliance with the standard used doesn't manage this issue.
The AS doesn't address the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69. The compliance with the standard used doesn't manage this issue.

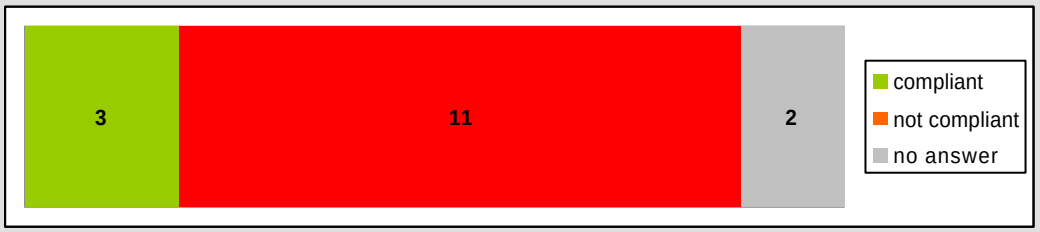
- Multiple representations (32-33)

No information provided.

- Data capturing rules (34)

Capturing rules are not specified for every spatial object type, in conformance with ISO 19131, as required by Req 73. The compliance with the standard used doesn't manage this issue.

Compliance with INSPIRE



5.5.3 Area management/restriction/regulation zones and reporting units

Main aim of the project was the implementation of a territorial information system focusing on habitat and ecosystems in SIC and ZPS areas of Sardinia Region. In particular, main feature of the systems are:

- access and consultation of cartographic and alphanumeric data acquired during the project with regard to Natura 2000 network and related habitat and species of Community interest;
- data loading from MS Access database "Natura2000" to upgrade historicised boards on sites already available in the database and to insert any new one - both cartographic and alphanumeric data search (SIT-Habitat).

Besides the theme “Area management/restriction/regulation zones and reporting units, other INSPIRE Annex III themes are partially involved:

- Bio-geographical regions
- Habitats and biotopes
- Species distribution

The respondent had a role in developing the conceptual data model, and states that case study’s responsibles are inclined to be involved in the future in Plan4All ASs testing.

IT-3	Italy	DIPSU/HYPERBOREA	AM

"Implementation of a system network to monitor the conservation status of habitats and species of Community interest in Sardegna Region (SIT Habitat)"

SIT Habitat Architecture
SIT Habitat Data Model

- Strengths and weaknesses (3-4)

The chosen project represents the current state of the art in information management and integrated fruition of ZPS (Special Protection Areas - "Birds" Directive 79/409/EC). Indeed, the project development addressed some of the issues covered by the "INSPIRE" Directive, in particular those concerning the description of spatial objects, namely:
- unique identification
- cartographic description mode
- information temporal evolution.

On the other hand issues related to the description of data and services through proper metadata catalogue were not considered as part of the project and, therefore, have not been faced.

- Terminology (8)

No standard glossary, containing general terms and definitions regarding geographic information and spatial data planning, has been adopted.

- Reference model (9)

No standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

UML v. 1.4 is the adopted conceptual schema language, and three software for the ASs development had been used:
J2SE v. 1.6, OpenLayers, Geoserver .

- Spatial and temporal aspects (14-15)

There are no rules to express spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37.

- Multi-lingual text and cultural adaptability (16-17)

Code lists and enumerations are used whenever possible, as recommended by Rec 12, though they are not multilingual. This is considered unnecessary, as the monitoring system is intended to be used by officials and technicians of Sardegna Region.

- Coordinate referencing and units of measurement model (18-19)

There is a list of coordinate and temporal reference systems that may be used in the encoding of spatial objects, as required by Reqs 51 and 54.

- Modelling object references (20)

Spatial objects are not spatially or temporally referenced to existing spatial objects, as recommended by Rec 16. This issue has not been considered.

- Identifier management (21)

The spatial object types have a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

Data transformation from these data specifications to the corresponding INSPIRE data specifications will not be taken care of.

- Metadata (23-26)

Metadata elements are not complying with ISO 19115, as required by Req 64, simply because a metadata catalogue doesn't exist. The project commissioner, Sardegna Region, didn't budget for this issue.

- Maintenance (27-28)

Maintenance procedures are not specified as part of the data specifications.
The possible reasons for changes in spatial objects are not documented as part of the metadata, that don't exist.

- Data and information quality (29)

Data quality elements and sub-elements are not provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65, because a metadata catalogue has not been provided (see under "Metadata").

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are consistent one to another, as recommended by Rec 28. The AS addresses the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69.

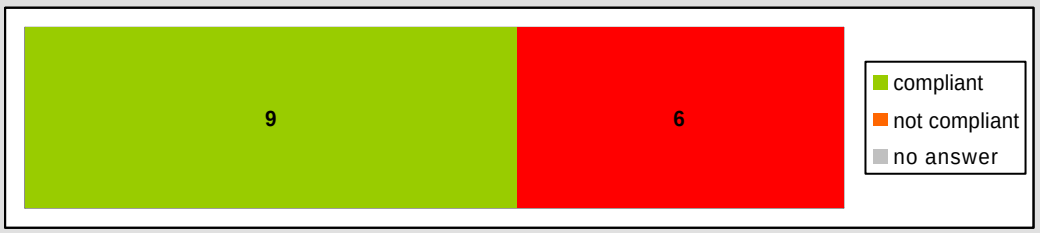
- Multiple representations (32-33)

There is just one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are not specified for every spatial object type, in conformance with ISO 19131, as required by Req 73. This issue has not been considered.

Compliance with INSPIRE



5.6. Latvia

TDF has provided one case study related to Land cover and Land use[1].

5.6.1 Land cover, land use

The chosen case study is the State Land Service of Latvia (SLS). It is a governmental institution, which performs realisation of land reform, ensures the maintenance of the National Real Estate Cadastre, ensures the maintenance of the Address Register and the information system of protective zones. The State Land Service is under the supervision of the Ministry of Justice of the Republic of Latvia.
The National Real Estate Cadastre IS contains two parts - graphic (spatial) and textual (description characters of the specific property). Only specific governmental regulations on information of cadastre may meet some demands on such kind of standards.
Most of all graphical data are available in new SLS data distribution portal www.kadastrs.lv:

- public version: only limited specific data set, without data on persons, textual and graphic part, the buildings are imaged as points on map, no possibilities to download or print screen, only image of point;
- authorized version (on a basis of agreement): different possibilities of searches and downloads of textual and graphic information, access to data on persons is limited.

All data of www.kadastrs.lv has only informative (not legal) character.
The cadastral data coverage (basic cadastral map in scale 1:10,000) is close to 99,98% of all territory of Latvia. The Real Estate Cadastre IS contains cadastral graphical/spatial data and textual information. There is no spatial historical data.
The layers of spatial data are: topographic map 1:500 with image of servitudes, encumbrances (spotted coverage), aero-photo map with image of land cover, cadastral basic map with cadastral borders, shapes of buildings, cross points of corners (1:10,000), land value zones (as a layer to cadastral map).
There is no available information in English about this case study. Only the portal www.latvija.lv includes some information in English. The respondent has provided the link: http://www.vzd.gov.lv.
The respondent has filled in the questionnaire in collaboration with the developers of the case study.

[1] SLS is also responsible for these data sets listed in the INSPIRE Annex 1 and 3: administrative borders, cadastral parcels, addresses, buildings. SLS also maintains topographic information (scale 1:500) and land value zonings. The IS of encumbered territories is being developed, the deadline of development depends on receiving further funding.

LV-1	Latvia	TDF	LC/LU

"SLS - State Land Service of Latvia"

http://www.vzd.gov.lv

- Strengths and weaknesses (3-4)

The SLS plans to develop a GIS System in near years (till 2012). All services relating to GIS information of the SLS will be connected in the future with Latvia's Geoportal (a description of the SLS services (27 sets) is available on the portal www.latvija.lv).
It has to be said that most SLS developments are still in progress, or at a planning stage.

- Terminology (8)

There is no official standard glossary containing general terms on spatial data of SLS.

- Reference model (9)

There is only a standard contained in the Regulation of Cabinet of Ministers n° 182 (2006) on content and updating of cadastral data. Anyways, there have been many amendments during the last years, and more are planned for the next future.

- Rules for Application Schemas and Feature Catalogues (10-13)

No information provided.

- Spatial and temporal aspects (14-15)

There are no rules to express spatial characteristics of spatial objects satisfying Req 36.
There are no rules to express temporal characteristics of spatial objects satisfying Req 37.

- Multi-lingual text and cultural adaptability (16-17)

Code lists and enumerations are not used whenever possible instead of free text attributes, as recommended by Rec 12.
The code lists are not multi-lingual (Req 47).
Currently, some of the information (also some feature catalogues of the Real Estate Cadastre IS) is available in English in the SLS data distribution portal www.kadastrs.lv. Also, all titles of data windows are translated into English. This information is translated for the purpose of joining the European Land Information Service (EULIS) portal.

- Coordinate referencing and units of measurement model (18-19)

There is no list of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51. The only official geodetic coordinate system in Latvia is LKS 92/Latvija TM (EPSG) 3059.
There is no list of temporal reference systems that may be used in the encoding of spatial objects, as required by Req 54.

- Modelling object references (20)

Spatial objects are not spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

Every spatial object type has a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications is currently in progress.

- Metadata (23-26)

No answer has been given to the question about metadata elements being or not ISO 19115-compliant, as required by Req 64.
There are no metadata schemas integrated into the AS.
Metadata types from ISO 19115 have been extended.

- Maintenance (27-28)

No information provided.

- Data and information quality (29)

Data quality elements and sub-elements are not provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65. The "Law on cadastre" (2006) and the Regulations of Cabinet of Minister n° 182 "Cadastral object determination and maintenance regulations" specifies cadastre data collection, actualisation and maintenance.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are not necessarily consistent one to another, as recommended by Rec 28.
The AS does not address the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69.

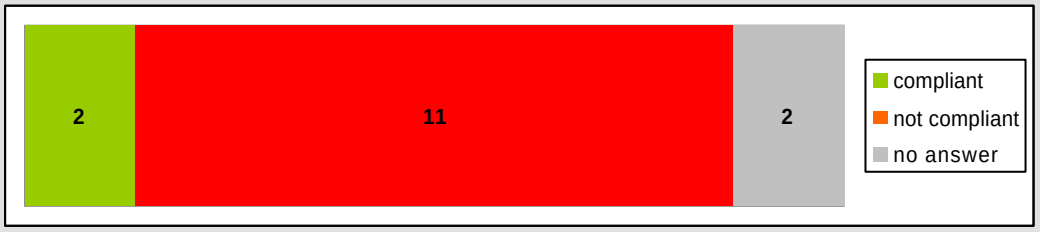
- Multiple representations (32-33)

There is one level of detail defined per theme (Rec29).

- Data capturing rules (34)

Capturing rules are not specified for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



5.7. The Netherlands

As regards the Netherlands, ISOCARP has provided one case study related to Land use and Area management/restriction/regulation zones and reporting units.

5.7.1 Land use, Area management/restriction/regulation zones and reporting units

IMRO2008 is the Dutch standard for developing land use plans. It is a set of standards with specifications for digital land use plans at all administrative levels. The digital plans are the legally binding documents. The use of the standard is legally binding. Land use plans also include area management, restriction and regulation zones.
The respondent has provided a document describing this standard ("IMRO2008 - Information model for Spatial Planning - Model document: model description").
ISOCARP had no role in developing this Application Schema, ISOCARP is only in collaboration with the developers of the ASs of this case study.

NL-1	the Netherlands	ISOCARP	LU/AM

"IMRO2008 - Information model for Spatial Planning"

"IMRO2008 - Information model for Spatial Planning - Model document: model description"

- Strengths and weaknesses (3-4)

These are fully developed and implemented standards for exchange of digital land use plans; moreover, they are legally binding.

- Terminology (8)

These data specifications use a non-legally binding terminology.

- Reference model (9)

A non-legally standard has been adopted for developing these data specifications.

- Rules for Application Schemas and Feature Catalogues (10-13)

UML 2.1 has been adopted for this standard.
The software used for its development is Enterprise Architect v.7.5.

- Spatial and temporal aspects (14-15)

There are rules to express spatial characteristics of spatial objects satisfying Req 36.
There are no rules to express temporal characteristics of spatial objects satisfying Req 37. This is considered unnecessary, because the date is used as an attribute and all the objects within one plan (dataset) are considered having the same date as the plan itself. The dates refer to the legal stadia of the planning process (draft, approved, etc.). In the date character string field it is mandatory to use the yyyy-mm-dd date format.

- Multi-lingual text and cultural adaptability (16-17)

Whenever possible, code lists and enumerations are used, instead of free text attributes, as recommended by Rec 12.
The code lists are not multi-lingual (Req 47). The lists contain domain values, mostly text, and no codes (numbers) that would have to be looked up in look-up tables to explain their meaning.

- Coordinate referencing and units of measurement model (18-19)

There are lists of coordinate and temporal reference systems that may be used in the encoding of spatial objects, as required by Reqs 51 and 54.

- Modelling object references (20)

Where possible, spatial objects are spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, as recommended by Rec 16.

- Identifier management (21)

Every spatial object type has a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

The data transformation from these data specifications to the corresponding INSPIRE data specifications is in progress.

- Metadata (23-26)

Metadata elements are not complying with ISO 19115, as required by Req 64. This is considered unnecessary, as there seems to be no internal advantage.
There are no metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are specified as part of the data specifications.
The possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are not provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are not necessarily consistent one to another, as recommended by Rec 28. This is considered to be not relevant.
The AS addresses the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69.

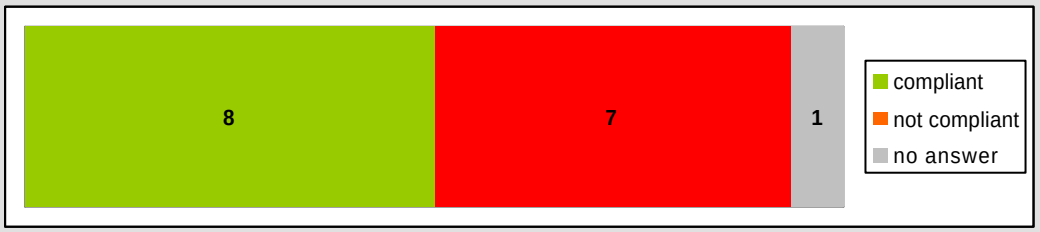
- Multiple representations (32-33)

Land use plans exist on national, regional and local level. Each with their specific legal context and content. Different level of detail within one plan type do not exist (Rec29).

- Data capturing rules (34)

Capturing rules are not specified for every spatial object type, in conformance with ISO 19131, as required by Req 73. This is considered to be not relevant, as spatial object borders are virtual and cannot be related to real world objects.

Compliance with INSPIRE



5.8. Spain

Italy (DIPSU) has provided a case study from Spain, related to Land cover and Land use at national level.

5.8.1 Land cover, Land use

The National Geographic Institute of Spain (IGN) is the National Reference Centre for Land cover and Land use (EIONET´s National Reference Centre for Land Cover & Spatial Analysis, by mandate of the National Focal Point, the Spanish Ministry of Environment); according to this mandate, IGN must coordinate the information in Spain related to land cover and land use.

This new land cover and land use information system of Spain (SIOSE), able to integrate different data of regional and national administrations, is a very ambitious project destined to be a Spanish and European reference as regards geographic information. SIOSE is part of the National Land Monitoring Plan, managed and coordinated by the IGN, which hopes to achieve a multidisciplinary spatial data infrastructure, periodically updated, for the Spanish national and regional administrations. The objectives are:

- satisfy Spanish national and regional administration's requirements on land cover and land use information;
- avoid duplicity of data and reduce costs of Geographic Information;
- integrate regional administrations in the management, quality control and productions of the land cover and use national database and information system;
- satisfy EEA's and EU requirements in future CORINE Land Cover versions and on land cover and land use information;
- integrate land cover and land use databases and information coming from the Spanish national institutions;
- create the SDIC for INSPIRE on Land cover and Land use in Spain (SIOSE National Assembly);
- standardise the Land cover and Land use data model using object-oriented methodology and UML notation;
- define harmonised production methodology by consensus;
- share production costs and benefits;
- increase benefits;
- integration and cooperation in European and international policies.

SIOSE's main antecedent is the European "Image & CORINE Land Cover 2000". The methodology and results of this project, produced in cooperation between national and regional administrations, is a key for SIOSE, but SIOSE has an object-oriented data modelling approach.

SIOSE will be the reference information system on land cover and land use for Spain, based on the INSPIRE principle: "spatial data collected at one level of public authority is to be shared between all the different levels of public authorities".

In 2005 several SIOSE thematic working groups have been set up, formed by representatives of regional and national administrations, and also by experts in land cover and land use from public and private organisations, with the following thematic/sector criteria:

- urban;
- agricultural;
- forestry;
- methodology and GIS;
- reference images;

- data dissemination.

These Thematic Working Groups have reached an agreement on the basic methodology and technical aspects for the production of SIOSE and its Conceptual Data Model, described in SIOSE technical document provided by IGN, approved by the SIOSE National Assembly in December 2005.

Just like in other case studies related to Land cover and Land use, there is a partial overlapping with almost all of the other INSPIRE themes, especially Hydrography and Transport networks.

The respondent contacted by DIPSU didn't have a direct role in developing the conceptual data model, but compiled the questionnaire in collaboration with its developers; who are nevertheless not inclined to be involved in the future testing of Plan4All application schemas.

IT-4	Spain	DIPSU (in collaboration with Spanish IGN)	LC/LU

"SIOSE - Spanish Land Cover and Use Information System"

- Strengths and weaknesses (3-4)

The best way to get objective territorial analysis, is to use a homogeneous database that considers all thematic groups of geographic information.
On the other hand, currently there are a lot different databases where this information is spread.

- Terminology (8)

The terminology is currently based on glossaries standardised at national (centralised) level.

- Reference model (9)

A national (centralised) standard for the development of data specifications is adopted.

- Rules for Application Schemas and Feature Catalogues (10-13)

UML v. 2.0 is the adopted conceptual schema language.
As regards the software for AS developing, Enterprise Architect and Microsoft Visio have been used.

- Spatial and temporal aspects (14-15)

There are rules to express both spatial and temporal characteristics of spatial objects satisfying Reqs 36 and 37.

- Multi-lingual text and cultural adaptability (16-17)

Code lists and enumerations are not used, as recommended by Rec 12. The developer has conformed to standards that don't manage this issue.

- Coordinate referencing and units of measurement model (18-19)

There is a list of coordinate reference systems that may be used in the encoding of spatial objects, as required by Req 51, but there are no lists of temporal reference systems as required by Req. 54, this issue has not been managed.

- Modelling object references (20)

Spatial objects are not spatially or temporally referenced to existing spatial objects, as recommended by Rec 16. The developer has conformed to standards that don't manage this issue.

- Identifier management (21)

The spatial object types have a property of type "Identifier" for the unique identification of spatial objects, as required by Req 58.

- Data transformation (22)

Data transformation from these data specifications to the corresponding INSPIRE data specifications are currently in progress.

- Metadata (23-26)

Metadata elements are complying with ISO 19115, as required by Req 64.
There are metadata schemas integrated into the AS.
Metadata types from ISO 19115 have not been extended.

- Maintenance (27-28)

Maintenance procedures are not specified as part of the data specifications.
The possible reasons for changes in spatial objects are not documented as part of the metadata.

- Data and information quality (29)

Data quality elements and sub-elements are provided with metadata, according to ISO 19113 and the implementing rule on metadata, as required by Req 65.

- Consistency between data (30-31)

In cases where multiple levels of detail are specified for a theme, the representations are not necessarily consistent one to another, as recommended by Rec 28; neither does the AS address the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, as required by Req 69. The developer has conformed to standards that don't manage these issues.

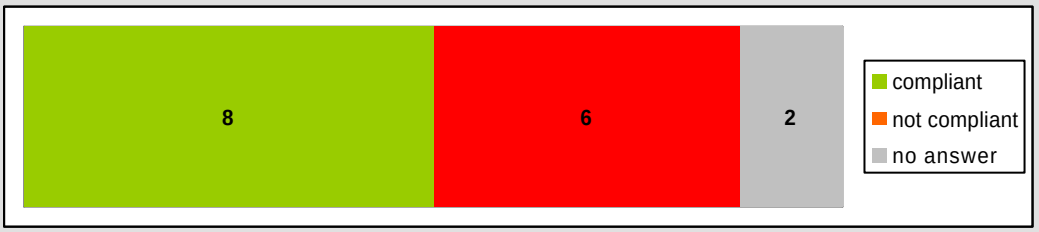
- Multiple representations (32-33)

No answer has been given about number of detail levels and their documentation as part of data specifications.

- Data capturing rules (34)

No answer has been given about specification of capturing rules for every spatial object type, in conformance with ISO 19131, as required by Req 73.

Compliance with INSPIRE



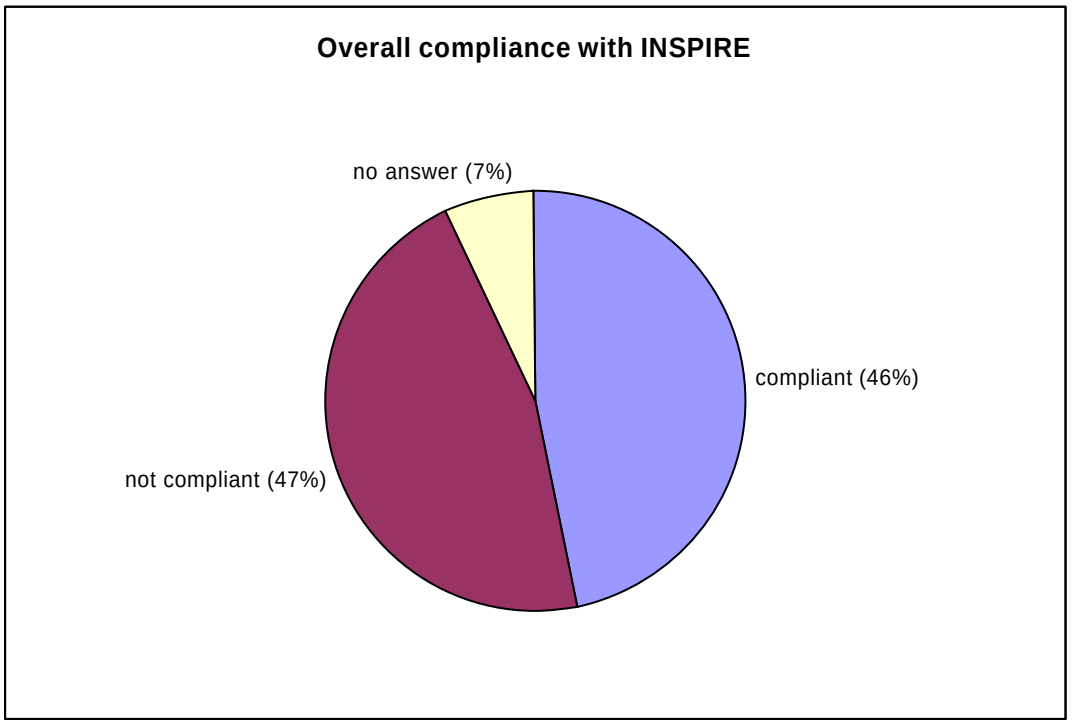
6. Conclusions

6.1. Case studies collected

We consider the number and variety of case studies collected as a quite good outcome of the questionnaire. These case studies will be used in T.4.2 as the starting bases for developing the Plan4all common data models for the seven selected INSPIRE themes.

6.2. Overall degree of compliance with INSPIRE

The questionnaire has been structured in order to allow to understand how much the case studies are close or far from compliance with INSPIRE. An assessment of the overall compliance with INSPIRE of the case studies has been made by simply adding up the number of "yes" and "no" answers to the questions relating to the INSPIRE requirements and recommendations.
It is necessary to say that the non-compliance with INSPIRE doesn't necessarily have to be considered a weakness of the single case study or of the overall situation in Europe. Indeed, one of the aims of this work is to highlight the reasons why the compliance to certain INSPIRE requirements or recommendations is sometimes not desirable, difficult to obtain, or even useless, in consideration of the purposes of the single data specifications. This work intends to help the INSPIRE process to adjust some of its specifications by taking into account the needs of the developers of the data models and the users of the data around Europe. We believe that an added value of this work is that the questionnaire has been designed so as to allow the respondent to insert free comments in order to justify/explain the reasons why certain requirements/recommendations have not been taken into account by the developer of the data specifications; and this is meant to be valid information for who is working in the process of implementing the INSPIRE Directive.

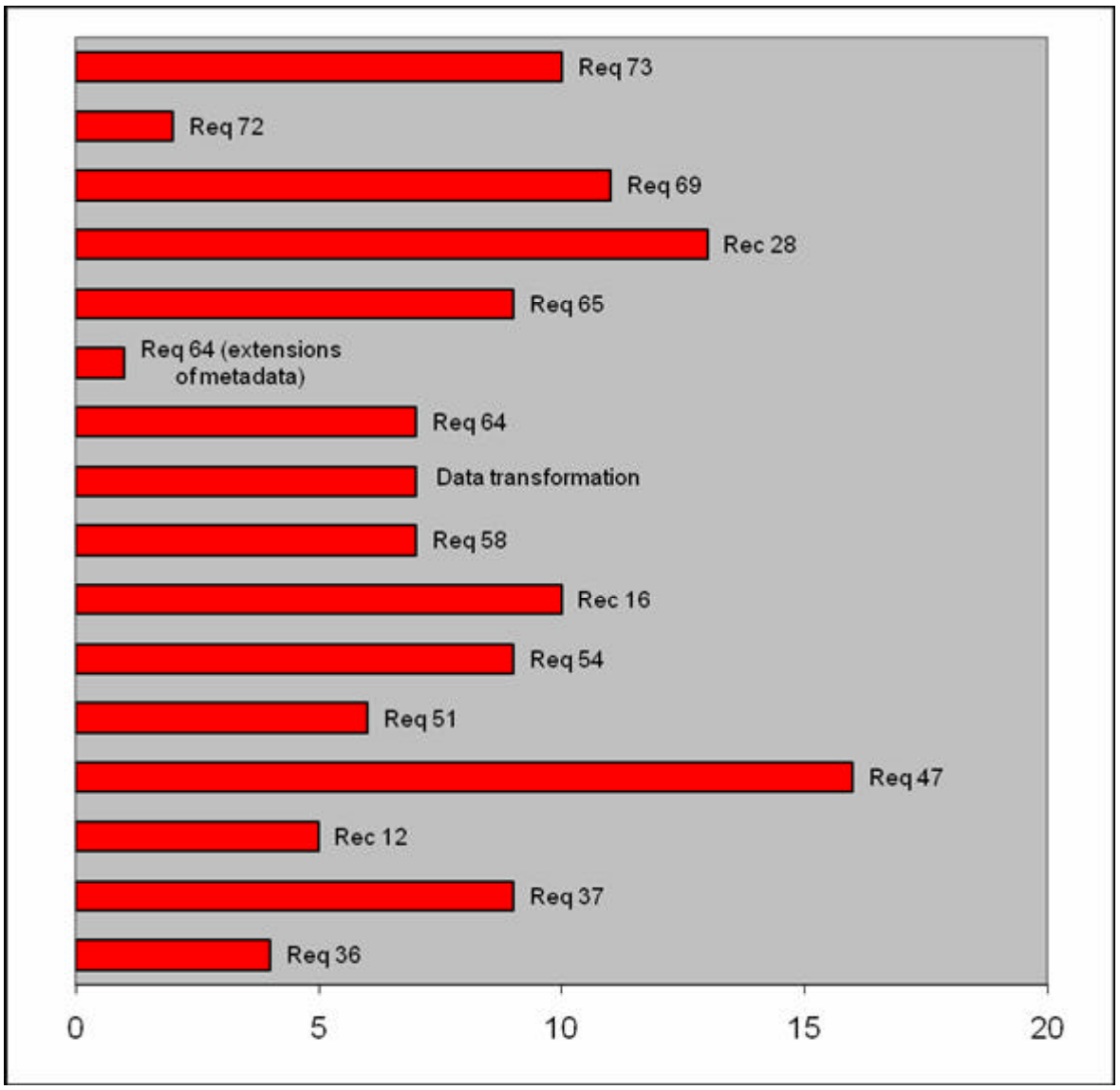


Overall compliance with the INSPIRE requirements and recommendations.

6.3. Aspects farthest from compliance

The highest number of "no" answers to the questions regarding the compliance with the INSPIRE requirements and recommendations is concentrated in the following issues:

- Requirement 37: rules to express temporal characteristics of spatial objects;
- Requirement 47: multi-lingual code lists;
- Requirement 54: list of temporal reference systems;
- Recommendation 16: object referencing;
- Requirement 65: data quality elements;
- Recommendation 28: consistency of representations, when multiple levels of detail are defined for a theme;
- Requirement 69: consistency between spatial data;
- Requirement 73: capturing rules.



Number of "no" answers to the questionnaire for each issue.

ECP-2008-GEO-318007

Plan4all

Analysis of conceptual data models for selected themes used in single countries

ANNEX I

Deliverable number	*D-4.1*
Dissemination level	*Public*
Delivery date	*15 March 2010*
Status	*Final*
Author(s)	*Flavio Camerata, Giuseppina Pellegrino*

Please read instructions carefully.

Task T.4.1 intends to **compare and analyse the conceptual data models used in the single countries for the selected INSPIRE themes**. For this reason, we need to collect **the partners' data models** (if they have some) and/or **the models used by other institutions** outside the consortium, considered to be good practices. Besides this, there will be **a specific questionnaire** to be filled in by the institutions providing their data models, as shown during the meeting in Malta.

During the meeting we also agreed that, in order to better organise the work, each country will have a **coordinator** in charge of collecting the relevant data models **of his own country**[1], by involving:

- his own organisation;
- the other P4A partners in the country;
- and, if needed, the other institutions (outside the consortium) in the country.

The coordinator will be responsible for collecting the data models and the questionnaires from the involved institutions within the deadline.

This is only a **first survey**, please indicate the partner/institution you intend to collect the data models and information from. Please indicate also the Plan4All themes that you can cover by providing these case studies. We understand that, in many cases, **the existing data models comprise more than one theme**, if so please tick more than one theme for each data model.

After having collected all your proposals/availabilities, we will have a full view of the overall availability of themes and we will propose how to divide the collection of study cases among partners. Then we will send the questionnaire to the coordinators.

Please return this form by November 13th.

[1] ISOCARP has agreed to provide information on NE, UK, and other countries outside the consortium.

Country:
Country coordinator:
Persons/month in T.4.1:

Proposed study cases from:	**Themes covered by the data model (one or more theme):**	**Notes**
☐ own institution (if applicable)	Data model 1 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 2 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 3 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐

Proposed study cases from:	**Themes covered by the data model (one or more theme):**	**Notes**
☐ other P4A partner(s) to be involved in the same country, please specify (if applicable):		
partner 1: ☐	Data model 1 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 2 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 3 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
partner 2: ☐	Data model 1 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 2 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 3 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐

partner 3:	Data model 1 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	
	Data model 2 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	
	Data model 3 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	
partner 4:	Data model 1 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	
	Data model 2 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	
	Data model 3 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	

Proposed study cases from:	**Themes covered by the data model (one or more theme):**	**Notes**
☐ other institution(s) to be involved in the same country, please specify (if applicable):		
institution 1: ☐	Data model 1 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 2 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 3 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
institution 2: ☐	Data model 1 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 2 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 3 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐

institution 3: ☐	Data model 1 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 2 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
	Data model 3 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
institution 4: ☐	Data model 1 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐
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	Data model 3 ☐ land cover ☐ land use ☐ utility and govt. services ☐ prodct./indstr. facil. ☐ agr./aquac. facil. ☐ area mangmt./restr./regul. zones/reprt. units ☐ nat. risk zones	☐

ECP-2008-GEO-318007

Plan4all

Analysis of conceptual data models for selected themes used in single countries

ANNEX II

Deliverable number	*D-4.1*
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Author(s)	*Flavio Camerata, Giuseppina Pellegrino*

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Plan4all

Task 4.1

Analysing and comparing Conceptual Data Models used in single countries for selected INSPIRE (Annex II and III) themes

Questionnaire instructions

e*Content*plus

This project is funded under the *e*Content*plus* programme[1],
a multiannual Community programme to make digital content in Europe more accessible, usable and exploitable.

[1] OJ L 79, 24.3.2005, p. 1.

Summary

Introduction and background

The project Plan4All focuses on implementation of INSPIRE Directive into spatial planning processes, in order to achieve interoperability and harmonisation of spatial planning data, based on the existing best practices in EU.
In this framework, one of the core objectives, aim of Work Package 4, is to design Conceptual Data Models for seven selected INSPIRE Themes involved in Spatial Planning, listed in Annex II and III of INSPIRE:

a) Land cover
Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.

b) Land use
Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).

c) Utility and governmental services
Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.

d) Production and industrial facilities
Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.

e) Agricultural and aquaculture facilities
Farming equipment and production facilities (including irrigation systems, greenhouses and stables).

f) Area management/restriction/regulation zones and reporting units
Areas managed, regulated or used for reporting at European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.

g) Natural risk zones
Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides, avalanches, forest fires, earthquakes, volcanic eruptions.

A more exhaustive description and use examples for each spatial data theme are available in the document:
http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.3_Definition_of_Annex_Themes_and_scope_v3.0.pdf

WP4 will be compliant to INSPIRE implementing rules related to Data Specifications, in particular to "INSPIRE Generic Conceptual Model" (see document: http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/D2.5_v3.2.pdf), which provides a framework within which harmonised Data Specifications for the INSPIRE spatial data themes will be developed, and for this purpose contains "Requirements" (Req), mandatory, and "Recommendations" (Rec), not mandatory.
See also "Methodology for the development of data specifications":
(http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.6_v3.0.pdf)
A Data Specification (DS) is a detailed description of a data set together with additional information that will enable it to be created, supplied to and used by another party (ISO 19131). It contains sections covering the following aspects:

- Overview
- Specification scopes
- Data product identification
- Data content and structure
- Reference systems
- Data quality
- Data capture
- Data maintenance
- Portrayal
- Delivery

Conceptual data modelling is related to the "Data content and structure" part of the DS for a theme.

What is a Conceptual Data Model (CDM) in plan4All project?
In order to represent and analyse real world by means of a GIS, and more in general to design any database, it is necessary to schematise reality through sequential steps, defining in the first instance a CDM that describes all the objects (and interactions between them) of interest to the aims of a specific application, totally independent from data formats and softwares used. The CDM must be sufficiently accurate to express the characteristics of the application, but also sufficiently simple to facilitate discussion between stakeholders and database developers, in order to guarantee that the subsequent database implementation picks all the essential aspects for the same application.
The CDM is what in INSPIRE documents is called "General Feature Model", and a CDM applied to a specific theme is the so called "Application Schema" (AS).
An AS is expressed in a formal "Conceptual Schema Language", which in INSPIRE, and Plan4All as well, shall be "Unified Modeling Language" (UML), version 2.1 (Req 19).

The model specifies the structure of a spatial data set, the spatial objects types (UML classes), their properties (attributes and operations), constraints, relationships between classes (aggregation, composition, generalisation/specialisation, association, dependency).
In brief, the issue of WP4 will be seven ASs for selected themes, integrated with "Feature Catalogues" (ISO 19110:2006) to provide definitions and descriptions of all the components of the models and to allow queries.
An example of AS compliant to INSPIRE Generic Conceptual Model is in the document:
http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_HY_v3.0.pdf
related to the theme "Hydrography" in Annex I of INSPIRE. This document is one out of the nine INSPIRE DS published as guidelines for the themes of Annex I, that will be a starting point to design Plan4All ASs.

WP4 (WP leader: DIPSU) will be implemented through two tasks:

- T.4.1 - Models used in single countries for selected themes (Task leader: TDF)
- T.4.2 - Conceptual data model definition for selected themes (Task leader: UWB)

WP4 will partially take advantage of WP2 results, in particular T.2.3 - Analysis of INSPIRE requirements and T.2.4 – Analysis of user requirements on planning systems.
Moreover, to analyse and compare conceptual data models used in single countries for the selected INSPIRE themes, best practices in spatial planning data modelling all over Europe will be collected among partners through a questionnaire within task T.4.1.
In brief, to make the different case studies comparable, partners shall not only provide material about best practices in conceptual data modelling, but will also answer specific questions.
In particular T.4.1 aims to collect the partners' data models (if they have some) and/or the models used by other institutions outside the consortium, considered to be good practices.
In order to better organise the work, each country will have a coordinator in charge of collecting the relevant data models of his own country, by involving his own organisation, the other Plan4All partners in the country and, if needed, other institutions (outside the consortium) in the country.
The coordinator will be responsible for collecting the data models and the questionnaires from the involved institutions within the deadline.

T 4.1 Questionnaire instructions

The questionnaire refers to the "INSPIRE Generic Conceptual Model D2.5 v3.2", in particular to part of the components relevant for data interoperability (see *figure 1*) and related requirements and recommendations (*table 1* and *table 2*), in order to understand to what extent the case studies comply with INSPIRE Generic Conceptual Model.

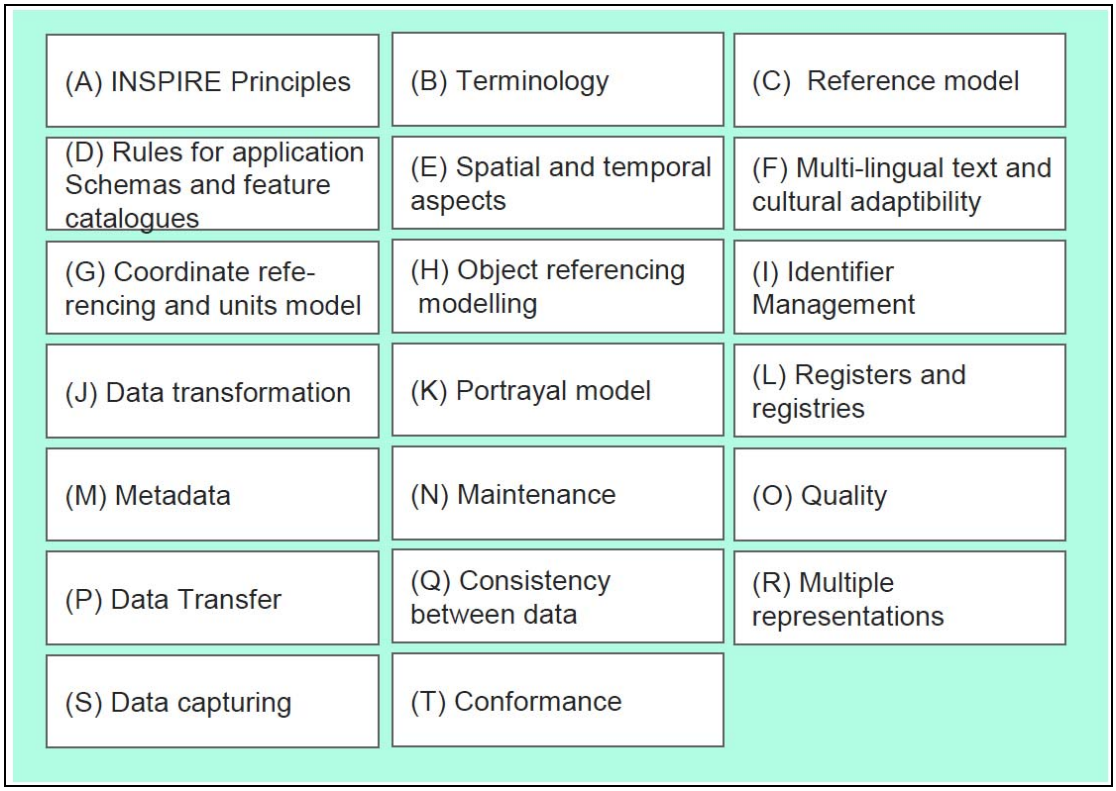

Figure 1: Interoperability components (from INSPIRE Generic Conceptual Model D2.5 v3.2)

TABLE 1 - Quoted Requirements for INSPIRE data specifications	
19	Every INSPIRE application schema shall be specified in UML, version 2.1
36	Spatial characteristics of a spatial object shall be expressed in an application schema in one of the following ways depending on the requirements: - by specifying properties of the spatial object type with a value that is a spatial geometry or a topology (see ISO 19109 8.7) - by specifying properties of the spatial object type with a value that is a geographic identifier in a gazetteer (see 9.9 and ISO 19109 8.9) - by specifying properties of the spatial object type with a value that is a coverage function (see 10.4) - by specifying references to other spatial objects (see Clause 13).
37	Temporal characteristics of a spatial object shall be expressed in an application schema in one of the following ways depending on the requirements: - by specifying properties of the spatial object type with a value that is a temporal geometry or a temporal topology (see ISO 19109 8.6; note that time is a dimension analogous to any of the spatial dimensions and that time, like space, has geometry and topology); - by specifying properties of the spatial object type with a value that is one of the basic types Date, DateTime and Time. However, this makes the attribute a “thematic attribute” instead of a “temporal attribute” in terms of the General Feature Model, as there is no temporal reference system connected to it (see note in ISO 19109 8.6.1), i.e. this method should be applied with care. The Gregorian calendar shall be the default calendar, UTC the default time zone.
47	Code lists specified in or referenced from an INSPIRE application schema shall be multi-lingual and use a language-independent code for every entry in the code list.
51	Every INSPIRE data specification shall specify the list of coordinate reference systems that may be used in the encoding of spatial objects defined by that data product specification.
54	Every INSPIRE data specification shall specify the list of temporal reference systems that may be used in the encoding of spatial objects defined by that data specification.

58	Every spatial object type of Annexes I and II of the INSPIRE Directive shall receive a non-voidable property of type "Identifier" (see 9.8.3.1), with multiplicity "0..1" or "1", unless it is known that no requirement exists to identify or reference spatial objects of that type.
64	For metadata, the data specification shall refer to the metadata elements from ISO 19115. If the types from ISO 19115 need to be extended in an INSPIRE application schema, the extensions shall conform to ISO 19109 and ISO 19115.
65	An INSPIRE data specification shall specify all data quality elements and subelements that are to be provided with the data set metadata in accordance with ISO 19113 and the implementing rule on Metadata. This shall include a statement on applicable data quality measures as defined in ISO/TS 19138.
69	Every INSPIRE application schema shall address the requirements on consistency between spatial data as stated in Article 8(3) of the Directive, if applicable. The rules governing consistency shall be modelled as far as possible as constraints.
72	In cases where multiple levels of detail are required, the requirement for the different levels shall be justified and documented as part of the data specification.
73	Where applicable, capturing rules and associated criteria shall be specified for every spatial object type as part of a INSPIRE data specification in conformance with ISO 19131.

TABLE 2 – Quoted Recommendations for INSPIRE data specifications	
12	Free text attributes in application schemas should be avoided; the use of code lists and enumerations is recommended whenever possible.
16	Recognising that object referencing to a common base (see Annex D) supports the principles in recital (6) of the INSPIRE Directive best, it is recommended to install structured object referencing by means of reference data where possible.
28	In cases where multiple levels of detail are specified for a theme (see Recommendation 29), the representations should in general be required to be consistent one to another. Multiple representations can be used to link the representation of different levels one to another but this will not be sufficient. Specific relationships, such as aggregation (partonomic relation or others), generalisation, selection or geometric simplification, should be described as accurately as possible to allow the automation of the consistency checking.
29	In principle, as few levels of detail as possible but as much as necessary should be defined per theme.

Besides answering the questionnaire, respondents are strongly invited to provide multiple specific applications (case studies) of ASs and Feature Catalogues for selected themes, together with metadata, references and all available information about the same ASs and Feature Catalogues (in English if available).

The questionnaire is divided into two sections:

- Section 1: Generic questions
- Section 2: Case study-specific questions

Respondents should compile section 2 as many times as the provided case studies are.

Glossary

The terms used in this Work Package are taken from "INSPIRE Generic Conceptual Model D2.5 v3.2", and are part of the INSPIRE Glossary and Feature Concept Dictionary: http://inspire-registry.jrc.ec.europa.eu/

(1) application schema
conceptual schema for data required by one or more applications [ISO 19101]

(2) class
description of a set of **objects** that share the same properties, constraints, and semantics [UML 2.1.2 - modified]

(3) code list
value domain including a code for each permissible value [ISO 19136]

(4) conceptual model
model that defines concepts of a universe of discourse [ISO 19101]

(5) conceptual schema
formal description of a **conceptual model** [ISO 19101]
EXAMPLE ISO 19107 contains a formal description of geometrical and topological concepts using the conceptual schema language UML.

(6) conceptual schema language
formal language based on a conceptual formalism for the purpose of representing **conceptual schemas** [ISO 19101]
EXAMPLE UML, EXPRESS, ORM and INTERLIS are examples of conceptual schema languages.

(7) coordinate reference system
systems for uniquely referencing spatial information in space as a set of coordinates (x,y,z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum [INSPIRE Directive]
NOTE 1 ISO 19111 defines coordinate reference system as a coordinate system that is related to an object by a datum. For geodetic and vertical datums, the object will be the Earth.
EXAMPLE 1 A national coordinate system with the datum ETRS89.
NOTE 2 Although the definition in the INSPIRE Directive is strictly seen restricted to spatial reference systems, temporal and parametric coordinate reference systems are nevertheless understood within INSPIRE as covered by the term coordinate reference systems as well, because temporal information has to be associated with a reference system just like spatial information. ISO 19111 also recognises temporal reference systems explicitly and provides mechanisms to specify spatio-temporal coordinate reference systems. A revision of ISO 19108 is foreseen to specify the conceptual model for temporal coordinate reference systems. Parametric coordinate reference systems are currently being standardised in ISO 19111-2.
EXAMPLE 2 The Gregorian calendar is a temporal reference system.

(8) coverage
spatial object that acts as a function to return values from its range for any direct position within its spatial, temporal or spatiotemporal domain [ISO 19123 - modified]
EXAMPLE Orthoimage, digital elevation model (as grid or TIN), point grids etc

(9) data interoperability component
individual aspect that will be addressed to support the **interoperability** of **spatial data sets**
EXAMPLE Rules for application schemas, identifier management, terminology, etc. are examples of the components.

(10) data interoperability process
process of developing **harmonised data product specifications** and implementing the necessary arrangements to transform **spatial data** into **interoperable spatial data**
NOTE Two general options exist: The reference version of the spatial data set may either be changed/restructured itself ("harmonised") or it may be kept as-is and the transformation may occur on-the-fly whenever a spatial data service operating on the spatial data set is invoked. In cases where the location of a spatial object has to be changed to comply with Article 10 (2), it is expected that the location information in the reference version of the spatial data set is updated to reflect the mutual consent.

(11) data product
data set or data set series that conforms to a **data product specification** [ISO 19131]

(12) data product specification
detailed description of a **data set** or data set series together with additional information that will enable it to be created, supplied to and used by another party [ISO 19131]

(13) data set
identifiable collection of data [ISO 19115]

(14) data specification
(used as a synonym to data product specification)
NOTE If the context is unambiguous, "data specification" is often used instead of "INSPIRE data specification" to improve readability.

(15) entity
real-world phenomenon

(16) enumeration
data type whose values are enumeration literals [UML 2.1.2 - modified]

(17) endonym
name of a **spatial object** in one of the languages occurring in that area where the **spatial object** is situated [UNGEGN Glossary of Terminology - modified]

(18) exonym
name used in a specific language for a **spatial object** situated outside the area where that language is spoken, and differing in its form from the name used in an official or well-established language of that area where the **spatial object** is located [UNGEGN Glossary of Terminology - modified]

(19) external object identifier
unique object identifier which is published by the responsible body, which may be used by external applications to reference the **spatial object**

(20) feature
abstraction of real world phenomena [ISO 19101]
NOTE The term "(geographic) feature" as used in the ISO 19100 series of International Standards, in other specifications like IHO S-57, and in this document is synonymously with **spatial object** as used in this document. Unfortunately "spatial object" is also used in the ISO 19100 series of International Standards, however with a different meaning: a spatial object in the ISO 19100 series is a spatial geometry or topology.

(21) feature catalogue
catalogue(s) containing definitions and descriptions of the **spatial object types**, their attributes and associated components occurring in one or more **spatial data sets**, together with any operations that may be applied [ISO 19110 – modified]

(22) feature concept
concept that may be specified in detail as one or more **spatial object types** [ISO/DIS 19126 – modified]
EXAMPLE The feature concept 'road' may be used to specify several different spatial object types, each with a different set of properties appropriate for a particular application. For a travel planning application, it might have a limited set of attributes such as name, route number, location and number of lanes, while for a maintenance application it might have an extensive set of attributes detailing the structure and composition of each of the layers of material of which it is composed.

(23) feature concept dictionary
dictionary that contains definitions of and related descriptive information about concepts that may be specified in detail in a **feature catalogue** [ISO/DIS 19126]

(24) gazetteer
directory of instances of a class or classes of features containing some information regarding position [ISO 19112]
NOTE A gazetteer can be considered as a geographical index or directory.

(25) general feature model
meta-model for **spatial object** types and their property types specified by ISO 19109

(26) geographic identifier
spatial reference in the form of a label or code that identifies a location [ISO 19112]
EXAMPLE 1 Place names: Paris, Rhine, Mont Blanc
EXAMPLE 2 Postal codes: 53115, 01009, SW1, IV19 1PZ

(27) geographical grid system
harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells [INSPIRE Directive]
NOTE 1 Geographical grid systems are not limited to rectified grids or grids using cell axes parallel to the meridians.
NOTE 2 This document adopts the definition of the 2003 Workshop on European Reference Grids, which includes not only the grid describing the domain of a coverage but also its range.

Thus, a 'geographical grid' is equivalent to an ISO 19123 coverage. The unqualified term 'grid' may refer either to a grid geometry or a geographical grid (coverage) depending on the context.

(28) geographical name
Proper noun applied to a topographic **spatial object** on Earth [UNGEGN Glossary of Terminology - modified]

(29) harmonised data product specifications
set of **data product specifications** that support the provision of access to **interoperable spatial data** through spatial data services in a representation that allows for combining it with other **interoperable spatial data** in a coherent way
NOTE 1 The harmonised data product specifications will be based on the data interoperability components.
NOTE 2 The harmonised data product specification is not intended to replace or deprecate existing data specifications that are currently in use.

(30) homologous spatial objects
set of **spatial objects** that correspond to the same real-world phenomenon, but are described by different information according to the different levels of details or point of views.

(31) identifier
linguistically independent sequence of characters capable of uniquely and permanently identifying that with which it is associated [ISO 19135]

(32) INSPIRE application schema
application schema specified in an INSPIRE data specification

(33) INSPIRE data specification
harmonised data product specification for a **theme** adopted as an Implementing Rule.

(34) internal object identifier
unique object identifier which is used internally and is not intended to be used to identify or reference the **spatial object** by external applications.

(35) interoperability
possibility for spatial data sets to be combined, and for services to interact, without repetitive manual intervention, in such a way that the result is coherent and the added value of the data sets and services is enhanced [INSPIRE Directive]

(36) interoperable spatial data
spatial data conformant to the **harmonised data product specifications**

(37) life-cycle information <spatial object>
set of properties of a **spatial object** that describe the temporal characteristics of a **version** of a **spatial object** or the changes between **versions**

(38) life-cycle rules <spatial object>
rules that specify the types of changes to a **spatial object** that result in either the creation of a new **version** or in the deletion / retirement of the **spatial object**

(39) linear reference system
reference system that identifies a location by reference to a segment of a linear **spatial object** and distance along that segment from a given point [ISO 19116 - modified]
EXAMPLE kilometre markers along a motorway or railway, references along the centre line of a river spatial object from the intersection with a bridge spatial object
NOTE synonymous with linear referencing system

(40) linguistic text
text consisting of or related to language

(41) metadata
information describing **spatial data sets** and spatial data services and making it possible to discover, inventory and use them [INSPIRE Directive]
NOTE A more general definition provided by ISO 19115 is "data about data"

(42) multicultural
multiplicity in systems of values held by different groups: ethnic, regional, or professional [Hofstede G. 1980. Culture's Consequences, Sage: London – modified]

(43) multilingual
in or using several languages [Oxford Dictionary]

(44) multiple representation
representation of the relationship between **homologous spatial objects**

(45) object
in this document used synonymous with ***spatial object***

(46) object referencing
consistent method of referencing **spatial data** to location using existing **spatial objects**

(47) ontology
representation of a set of concepts within a domain and the relationships between those concepts [Wikipedia]

(48) profile
set of one or more base standards or subsets of base standards, and, where applicable, the identification of chosen clauses, classes, options and parameters of those base standards, that are necessary for accomplishing a particular function [ISO 19106]
NOTE A profile is derived from base standards so that by definition, conformance to a profile is conformance to the base standards from which it is derived.

(49) reference data
spatial objects that are used to provide location information in **object referencing**
NOTE Typical reference data are topographic or cadastral data.

(50) reference model
architectural framework for a specific context, e.g. an application or an information infrastructure
EXAMPLE ISO 19101 and the OGC Reference Model are reference models

(51) register
set of files containing identifiers assigned to items with descriptions of the associated items [ISO 19135]

(52) registry
information system on which a **register** is maintained [ISO 19135]

(53) spatial data
data with a direct or indirect reference to a specific location or geographic area [INSPIRE Directive]
NOTE The use of the word “spatial” in INSPIRE is unfortunate as in the everyday language its meaning goes beyond the meaning of “geographic” – which is considered by the Drafting Team as the intended scope – and includes subjects such as medical images, molecules, or other planets to name a few. However, since the term is used as a synonym for geographic in the Directive, this document uses the term “spatial data” as a synonym for the term “geographic data” used by the ISO 19100 series of International Standards and which is defined as “data with implicit or explicit reference to a location relative to the Earth.”

(54) spatial data set
identifiable collection of spatial data [INSPIRE Directive]

(55) spatial object
abstract representation of a real-world phenomenon related to a specific location or geographical area [INSPIRE Directive]
NOTE It should be noted that the term has a different meaning in the ISO 19100 series. It is also synonymous with "(geographic) feature" as used in the ISO 19100 series.

(56) spatial object type
classification of **spatial object**s
EXAMPLE Cadastral parcel, road segment, or river basin are all examples of potential spatial object types.
NOTE In the conceptual schema language UML a spatial object type will be described by a class with stereotype <<featureType>>.

(57) spatial reference system
system for identifying position in the real world [ISO 19112]
NOTE Spatial reference systems do not necessarily use coordinates to identify a position.
EXAMPLE Geographic coordinates describing positions on the Earth surface (coordinate reference system), linear measurements along a river centreline from the intersection of a bridge (linear reference system), postal codes identifying the extent of postal zones (gazetteer).

(58) spatial schema
conceptual schema of spatial geometries and topologies to be used in an **application schema**

(59) temporal reference system
reference system against which time is measured [ISO 19108]

(60) temporal schema
conceptual schema of temporal geometries and topologies to be used in an **application schema**

(61) thematic identifier
descriptive **unique object identifier** applied to **spatial objects** in a defined information **theme**
EXAMPLE an administrative code for administrative area spatial objects in the administrative units theme, a parcel code for parcel spatial objects in a cadastral theme

(62) theme
grouping of **spatial data** according to Annex I, II and III of the INSPIRE Directive

(63) unique object identifier
identifier associated with a **spatial object**

(64) unit
defined quantity in which dimensioned parameters are expressed [ISO 19111]

(65) version <spatial object>
particular variation of a **spatial object**
NOTE A version of a spatial object is associated with a version identifier allowing to distinguish two versions of the same spatial object. Versions are usually also associated with temporal information allowing a user to analyse the evolution of a spatial object.
EXAMPLE If a spatial object type Building has an attribute functionalUse, the value of the attribute changes due to a change in the way the building is used, and the life-cycle rules of the data set specify that a change in this attribute value will result in a new version, then a new version will be created and the existing version will be marked as superseded in its life-cycle information - often by specifying an end date/time for the lifespan of the version.

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Plan4all

Analysis of conceptual data models for selected themes used in single countries

ANNEX III

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Author(s)	*Flavio Camerata, Giuseppina Pellegrino*

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Plan4all

Task 4.1

Analysing and comparing Conceptual Data Models used in single countries for selected INSPIRE (Annex II and III) themes

Questionnaire – Section 1
Generic questions

e*Content*plus

This project is funded under the *e*Content*plus* programme[1],
a multiannual Community programme to make digital content in Europe more accessible, usable and exploitable.

[1] OJ L 79, 24.3.2005, p. 1.

Section 1: Generic questions

- **Introduction**

1- Please type your name, company, role within the company, country and e-mail address.

First Name:	
Surname:	
Company:	
Role:	
Country:	
e-mail:	

- **Reference Model**

2- Are there legally binding standards for the development of data specifications within your country?

☐ **Yes**
☐ **No**

3- (If you answered yes to question 2) On which level?

☐	**National (centralised)**
☐	**National (federal)**
☐	**State (federal)**
☐	**Regional**
☐	**Other (specify:**)

4- (If you answered yes to question 2) Have they actually been applied? If not widely applied, try to explain possible reasons.

☐ **Yes**		
☐ **No**	**Possible reasons:**	

5- (If you answered yes to question 2) Do they comply to international standards? Which ones?

☐ **Yes**	**Specify:**	
☐ **No**		

6- Are there non-legally binding standards for the development of data specifications within your country?

☐ **Yes**
☐ **No**

7- (If you answered yes to question 6) On which level?

☐	**National (centralised)**
☐	**National (federal)**
☐	**State (federal)**
☐	**Regional**
☐	**Other (specify:**)

8- (If you answered yes to question 6) Have they actually been applied? If not widely applied, try to explain possible reasons.

☐ **Yes**		
☐ **No**	**Possible reasons:**	

9- (If you answered yes to question 6) Do they comply to international standards? Which ones?

☐ **Yes**	**Specify:**	
☐ **No**		

10- Any other remark:

- **Rules for Application schemas and feature catalogues**

11- Are there legally binding standards for conceptual data modelling of spatial information within your country? (see this example: http://ec.europa.eu/enterprise/tris/pisa/cfcontent.cfm?vFile=120080195EN.PDF)

☐ **Yes**
☐ **No**

12- (If you answered yes to question 11) On which level?

☐	**National (centralised)**
☐	**National (federal)**
☐	**State (federal)**
☐	**Regional**
☐	**Other (specify: [ ])**

13- (If you answered yes to question 11) Do they exist for all the seven selected INSPIRE themes, or part of them? Which ones? Do they exist for other INSPIRE themes not involved in Plan4All? Which ones?

☐	**1 - Land cover**
☐	**2 - Land use**
☐	**3 - Utility and governmental services**
☐	**4 - Production and industrial facilities**
☐	**5 - Agricultural and aquaculture facilities**
☐	**6 - Area management/restriction/regulation zones and reporting units**
☐	**7 - Natural risk zones**
☐	**Other (specify: [ ])**

14- (If you answered yes to question 11) Have they actually been applied? If not widely applied, try to explain possible reasons.

☐ **Yes**		
☐ **No**	**Possible reasons:**	[ ]

15- Are there non-legally binding standards for conceptual data modelling of spatial information within your country?

☐ **Yes**
☐ **No**

16- (If you answered yes to question 15) On which level?

☐	**National (centralised)**
☐	**National (federal)**
☐	**State (federal)**
☐	**Regional**
☐	**Other (specify: [ ])**

17- (If you answered yes on question 15) Do they exist for all the seven selected INSPIRE themes or part of them? Which ones? Do they exist for other INSPIRE themes not involved in Plan4All? Which ones?

☐	**1 - Land cover**
☐	**2 - Land use**
☐	**3 - Utility and governmental services**
☐	**4 - Production and industrial facilities**
☐	**5 - Agricultural and aquaculture facilities**
☐	**6 - Area management/restriction/regulation zones and reporting units**
☐	**7 - Natural risk zones**
☐	**Other (specify:)**

18- (If you answered yes to question 15) Have they actually been applied? If not widely applied, try to explain possible reasons.

☐ **Yes**		
☐ **No**	**Possible reasons:**	

19- Please provide files in attachment about standards (if existing) for conceptual data modelling adopted within your country.

20- Any other remark:

- **Data transformation**

21- Did your country (or is your country going to) take care of data transformation between its own data specifications and the corresponding INSPIRE data specifications?

☐ **Yes (Programme concluded)**
☐ **Yes (Programme in progress)**
☐ **No**

22- (If you answered yes to question 21) On which level have the programmes been promoted?

☐	**National (centralised)**
☐	**National (federal)**
☐	**State (federal)**
☐	**Regional**
☐	**Other (specify:)**

23- Could possible modifications to INSPIRE simplify data transformation? Which ones?

Possible modifications:	

24- Any other remark:

- **Registers and registries**

25- Are there examples of ISO 19135-conformant on-line registers of feature catalogues, application schemas, code lists, coordinate reference systems, units of measurements, external object identifier namespaces, within your country?

☐	**Feature concept dictionary**
☐	**Feature catalogues**
☐	**Application schemas**
☐	**Code lists**
☐	**Coordinate reference systems**
☐	**Units of measurements**
☐	**External object identifier namespaces**
☐	**Glossary**
☐	**Other (specify:)**
☐	**None**

26- Please provide hyperlinks to some example registries.

27- Any other remark:

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Plan4all

Analysis of conceptual data models for selected themes used in single countries

ANNEX IV

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Author(s)	*Flavio Camerata, Giuseppina Pellegrino*

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Plan4all

Task 4.1

Analysing and comparing Conceptual Data Models used in single countries for selected INSPIRE (Annex II and III) themes

Questionnaire – Section 2
Case study specific questions

e*Content*plus

This project is funded under the *e*Content*plus* programme[1],
a multiannual Community programme to make digital content in Europe more accessible, usable and exploitable.

[1] OJ L 79, 24.3.2005, p. 1.

Section 2: Case study-specific questions

- **Introduction**

1- Case study name and short description

Case study name:	
Short description:	

2- Which of the seven selected themes are represented in this case study (please consider that the same data model can deal with more than one theme)? Are they mixed with other themes external to the seven selected? Which ones?

☐	**1 - Land cover**
☐	**2 - Land use**
☐	**3 - Utility and governmental services**
☐	**4 - Production and industrial facilities**
☐	**5 - Agricultural and aquaculture facilities**
☐	**6 - Area management/restriction/regulation zones and reporting units**
☐	**7 - Natural risk zones**
☐	**Other (specify:)**

3- Why did you choose this case study? Describe case study's strengths

Case study's strengths:	

4- Describe case study's weaknesses

Case study's weaknesses:	

5- Please let us know if you had a role in developing ASs in this case study, and/or you are compiling this questionnaire in collaboration with the developers of the ASs.

☐	**I had a role in developing ASs in this case study**
☐	**I'm compiling this questionnaire in collaboration with the developers of the ASs of this case study**
Other remarks	

6- Are the persons involved in the case study inclined to be involved in the future in Plan4all ASs testing?

☐ **Yes**
☐ **No**

7- Any other remark:

☐

- **Terminology**

8- Which standard glossary, containing general terms and definitions regarding geographic information and spatial data planning, is adopted?

☐	**None**
☐	**Legally binding**
☐	**Non legally binding**
☐	**National (centralised)**
☐	**National (federal)**
☐	**State (federal)**
☐	**Regional**
☐	**Other (specify:** ☐ **)**

- **Reference Model**

9- Which standard for the development of data specifications is adopted?

☐	**None**
☐	**Legally binding**
☐	**Non legally binding**
☐	**National centralized**
☐	**National federal**
☐	**State**
☐	**Regional**
☐	**Complying with international standards (specify:** ☐ **)**
☐	**Other (specify:** ☐ **)**

- **Rules for Application schemas and feature catalogues**

10- Which Conceptual schema language is adopted to express ASs (UML or else)?

Conceptual Schema Language and version:	☐

11- Which software was used for ASs developing?

Software and version:	

12- Please provide files in attachment about the specific application (case study):
ASs and Feature Catalogues, together with metadata, references and all existing information about the same ASs and Feature Catalogues (in English if available).

13- Any remark:

- **Spatial and temporal aspects**

14- Are there rules to express spatial characteristics of spatial objects in the ASs satisfying Req 36? If not, please try to explain possible reasons, e.g.”AS developer found difficulties in doing so” (explain what difficulties) / “AS developer conformed to standards in which this issue is not managed” / “AS developer considered it unnecessary doing so” (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**

15- Are there rules to express temporal characteristics of spatial objects in the ASs satisfying Req 37? If not, please try to explain possible reasons, e.g.”AS developer found difficulties in doing so” (explain what difficulties) / “AS developer conformed to standards in which this issue is not managed” / “AS developer considered it unnecessary doing so” (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**

		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:**)
		☐	**Other (specify:**)

- **Multi-lingual text and cultural adaptability**

16- Are code lists and enumerations used whenever possible instead of free text attributes in ASs (Rec 12)? If not, please try to explain possible reasons, e.g."AS developer found difficulties in doing so" (explain what difficulties) / "AS developer conformed to standards in which this issue is not managed" / "AS developer considered it unnecessary doing so" (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:**)
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:**)
		☐	**Other (specify:**)

17- (If applicable) Are code lists multi-lingual, and do they use a language-independent code for every entry in the code list (Req 47)? If not, please try to explain possible reasons, e.g."AS developer found difficulties in doing so" (explain what difficulties) / "AS developer conformed to standards in which this issue is not managed" / "AS developer considered it unnecessary doing so" (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:**)
		☐	**Conformance to standard not managing this issue**

		☐	**Unnecessariness (explain:**)	
		☐	**Other (specify:**)	

- **Coordinate referencing and units of measurement model**

18- Is there a list of coordinate reference systems, specified in the data specification, that may be used in the encoding of spatial objects? (Req 51)? If not, please try to explain possible reasons, e.g.”AS developer found difficulties in doing so” (explain what difficulties) / “AS developer conformed to standards in which this issue is not managed” / “AS developer considered it unnecessary doing so” (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**

19- Is there a list of temporal reference systems, specified in the data specification, that may be used in the encoding of spatial objects? (Req 54)? If not, please try to explain possible reasons, e.g.”AS developer found difficulties in doing so” (explain what difficulties) / “AS developer conformed to standards in which this issue is not managed” / “AS developer considered it unnecessary doing so” (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**

- **Modelling object references**

20- Are spatial objects spatially or temporally referenced to existing spatial objects, rather than directly via coordinates, where possible (Rec 16)? If not, please try to explain possible reasons, e.g.”AS developer found difficulties in doing so” (explain what difficulties) / “AS developer conformed to standards in which this issue is not managed” / “AS developer considered it unnecessary doing so” (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**

- **Identifier management**

21- Does every spatial object type have a property of type “Identifier” for the unique identification of spatial objects (Req 58)? If not, please try to explain possible reasons, e.g.”AS developer found difficulties in doing so” (explain what difficulties) / “AS developer conformed to standards in which this issue is not managed” / “AS developer considered it unnecessary doing so” (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**

- **Data transformation**

22- Did the persons responsible for the case study (or are they going to) take care of data transformation between their own data specification and the corresponding INSPIRE data specification?

☐ **Yes (Concluded)**
☐ **Yes (In progress)**
☐ **No**

- **Metadata**

23- Are metadata elements conform to ISO 19115 (Req. 64)? If not, please try to explain possible reasons, e.g."AS developer found difficulties in doing so" (explain what difficulties) / "AS developer conformed to standards in which this issue is not managed" / "AS developer considered it unnecessary doing so" (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**

24- Are there Metadata Schemas (ISO 19115) integrated into ASs?

☐ **Yes**
☐ **No**

25- Have metadata types from ISO 19115 been extended?

☐ **Yes**
☐ **No**

26- (If you answered yes to question 52) Do the extensions conform to ISO 19109 and ISO 19115 (Req 64)? If not, please try to explain possible reasons, e.g."AS developer found difficulties in doing so" (explain what difficulties) / "AS developer conformed to standards in which this issue is not managed" / "AS developer considered it unnecessary doing so" (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**

- **Maintenance**

27- Are maintenance procedures specified as part of data specification?

☐ **Yes**
☐ **No**

28- Are possible reasons for changes in spatial objects documented as part of the metadata?

☐ **Yes**
☐ **No**

- **Data and information quality**

29- Are data quality elements and sub-elements provided with metadata according to ISO 19113 and the implementing rule on metadata (see document http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/metadata/MD_IR_and_ISO_20090218.pdf) (Req 65)? If not, please try to explain possible reasons, e.g."AS developer found difficulties in doing so" (explain what difficulties) / "AS developer conformed to standards in which this issue is not managed" / "AS developer considered it unnecessary doing so" (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**

- **Consistency between data**

30- In cases where multiple levels of detail (see document http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/D2.5_v3.2.pdf, clause B3 page 112) are specified for a theme, are the representations consistent one to another (Rec 28)? If not, please try to explain possible reasons, e.g."AS developer found difficulties in doing so" (explain what difficulties) / "AS developer conformed to standards in which this issue is not managed" / "AS developer considered it unnecessary doing so" (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**

31- Do ASs address the requirements on consistency between spatial data as stated in Article 8(3)[1] of the Directive, if applicable (Req 69)? If not, please try to explain possible reasons, e.g."AS developer found difficulties in doing so" (explain what difficulties) / "AS developer conformed to standards in which this issue is not managed" / "AS developer considered it unnecessary doing so" (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**

[1] INSPIRE, Article 8(3) - The implementing rules shall be designed to ensure consistency between items of information which refer to the same location or between items of information which refer to the same object represented at different scales.

- **Multiple representations**

32- How many levels of detail are defined per theme (Rec 29)? (see document http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/D2.5_v3.2.pdf, clause B3 page 112

Levels of detail:	

33- In cases where multiple levels of detail per theme are required, is this requirement justified and documented as part of data specification (Req 72)?

☐ **Yes**
☐ **No**

- **Data capturing rules**

34- Are capturing rules specified for every spatial object type in conformance with ISO 19131 (Req 73)? If not, please try to explain possible reasons, e.g."AS developer found difficulties in doing so" (explain what difficulties) / "AS developer conformed to standards in which this issue is not managed" / "AS developer considered it unnecessary doing so" (explain why).

☐ **Yes**			
☐ **No**	**Possible reasons:**	☐	**Difficulties in doing so (explain:)**
		☐	**Conformance to standard not managing this issue**
		☐	**Unnecessariness (explain:)**
		☐	**Other (specify:)**