



INSPIRE Evaluation: Summary of findings for EU Member States

Assessing data and services metadata
resources through direct observations



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This document does neither represent the position of the Member States and countries under study.

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ABBREVIATIONS AND ACRONYMS

ANCPI	National Agency for Cadastre and Land Registration (Romania)
CRS	Coordinate Reference Systems
CSW	Catalog Service for the Web
DLS	Department of Lands and Surveys (Cyprus)
EU	European Union
GIS	Geographical Information System
FÖMI	Institute of Geodesy, Cartography and Remote Sensing (Hungary)
INSPIRE	INfrastructure for SPatial InfoRmation in Europe
JRC	Joint Research Centre
M&R	Monitoring & Reporting
MD	Metadata
NCP	National Contact Point
NMA	National Mapping Agency
NSDI	National Spatial Data Infrastructure
OGC	Open Geospatial Consortium
Q-GIS	Quantum GIS
URL	Uniform Resource Locator
XML	Extensible Markup Language
WFS	Web Feature Service
WMS	Web Mapping Service

1. INTRODUCTION

This report summarizes the findings of the INSPIRE Evaluation exercise which was carried out by 9 independent experts between December 2013 and March 2014. The exercise took place as part of the activities of the policy programme evaluation project of the European Commission to present a report to the Council and European Parliament by May 15th 2014 on the implementation of the INSPIRE Directive. The evaluation project conducts: 1) a desktop research 2) a public survey and 3) direct (sample based) observations of INSPIRE spatial data and services accessible through the EU geo-portal, and the data sharing measures/policies already implemented operationally in the Member States.

This summary report is describing the results of task 3. It is based on an investigation of which of the measures, for which the implementation deadline has passed (see Figure 1), are effectively implemented in the Member States, and whether for the services that are available, there are procedural obstacles, e.g. related to licencing, pricing, derogations, etc.

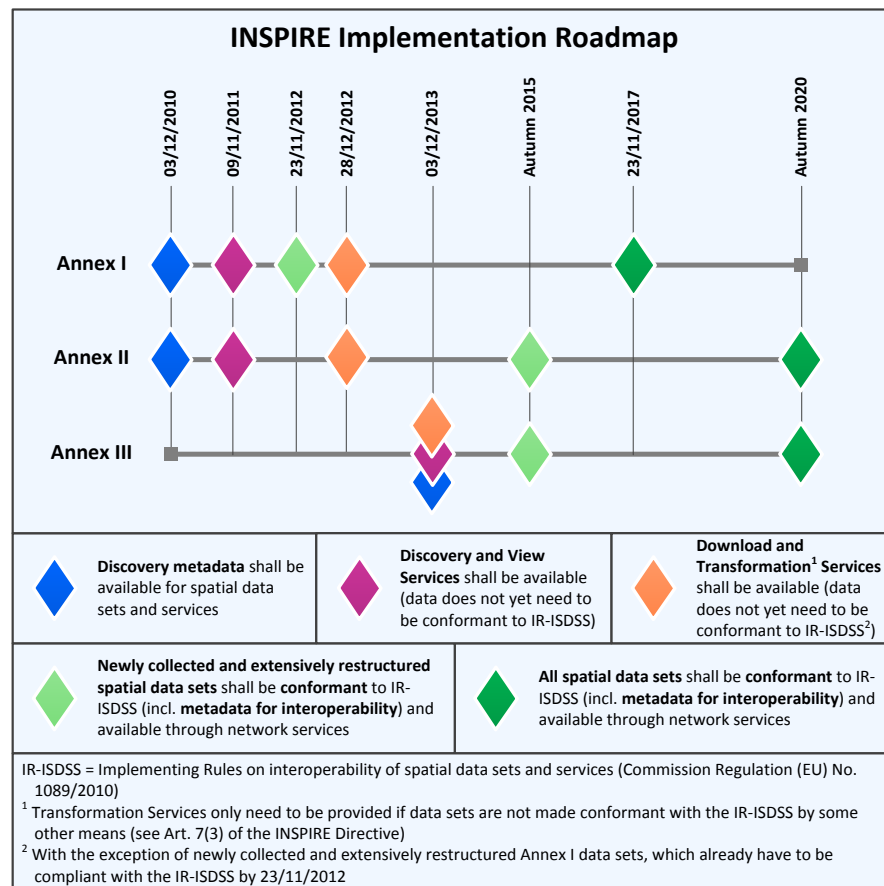


Figure 1: Overview of the measures that have to be implemented by Member States by the time of the investigation

The objectives of the INSPIRE evaluation through direct observations are the following:

1. To compare, analyze and better understand the differences between the results of the reported spatial data sets and services (INSPIRE M&R of May 2013) and those that can be found in the EU geo-portal.
2. To test the metadata records for spatial data sets and services, and to check their compliance with the INSPIRE Implementing Rules and Guidelines.
3. To better understand why certain spatial data sets and services relevant for INSPIRE can't be found in the Monitoring & Reporting sheets / EU geo-portal, but can be found in national or other portals within the Member States.

The second chapter of this report describes the approach for performing the direct observations. The third chapter summarizes the results of the tests on a sample of spatial data sets and services found in the Monitoring & Reporting sheets of the Member States, and examples of data sets and services that can't be found in those sheets, but that can be found in national or other portals.

At the time of writing of this report, the results of the 28 Member States were processed and integrated in the report.

2. APPROACH

For evaluating the existing components of the respective INSPIRE infrastructures the following approach has been applied by the evaluators.

The coordinator and the experts made a first quick screening of the different countries; countries were assigned to one of the 9 experts. This was done during a one day workshop held in Leuven on 3 December 2013. A first visit of the Monitoring & Reporting files as delivered by the Member States (Spring 2013), together with a visit of the metadata resources for spatial data sets and services revealed the first issues regarding accessibility and availability of information. For example, for a series of countries no resources could be found in the EU geoportal, for others the Monitoring & Reporting sheet was not directly accessible. Contacts were sought after the workshop to clarify the different issues.

In a next step, a selection of spatial data sets and services was made to be checked/tested using the metadata validator provided by the Joint Research Centre (JRC). The selection was based on a sampling method with the objective to cover around 10% of the reported spatial data sets and services, with a minimum of 10 and a maximum of 50¹. The selection was done taking into account the fact that different data and service providers are contributing to the infrastructure. For the selection of the spatial data sets also the distribution over the three annexes and 34 themes was taken into account. In case very few data sets or services were described, all were tested. It was also decided to verify all the described discovery services and the catalogues behind (they are a key component to make the infrastructure and the geoportal work).

For those countries that could be tested, a sample of 752 spatial data sets was validated, while 352 services were tested of which 249 view services and 103 download services. The discovery services found in the M&R were all checked (149) and when found back in the European INSPIRE portal also tested (63).

The selected spatial data sets and services were tested according to the following scheme (as fixed in the Terms of Reference):

For the selected **spatial data sets** from the 3 annexes

1. Check whether the data set is documented with metadata in the INSPIRE geoportal (i.e. is it delivered through a well-known INSPIRE discovery service).
 - a. Yes
 - i. Check if the metadata record is complete
 - ii. If the data set metadata includes a reference to a view service
 1. Check compliance (using the Resource Browser)
 2. Check if there are any restrictions on accessing the service
 - iii. If the data set metadata includes a reference to a download service
 1. Check compliance (using the Resource Browser)

¹ There are some exceptions to this rule: some countries have less, other more than these thresholds.

2. Check if there are any restrictions on accessing the service

b. No

- i. Check if metadata on the data set is available in the national geoportal or discovery service
- ii. Seek clarification with the data custodian (using the contact details provided in the monitoring report)

For the selected view and download **services**

2. Check whether the service is documented with metadata in the INSPIRE geoportal (i.e. is it delivered through a well-known INSPIRE discovery service).

a. Yes

- i. Check if the metadata record is complete
- ii. Check if the data provided through this service is declared in the monitoring report; if not, seek clarification with the service provider (using the contact details provided in the monitoring report)
- iii. Check compliance (using the Resource Browser)
- iv. Check if there are any restrictions on accessing the service

b. No

- i. Check if metadata on the service is available in the national geoportal or discovery service
- ii. Seek clarification with the service provider (using the contact details provided in the monitoring report)

In an additional step, web sites of data custodians in Member States were visited to find data and service resources that were not reported. The focus here was on those data themes for which Member States did not provide any data sets.

For a selection of data sets found:

3. Check why the data set can't be found in the M&R, nor in the European geoportal

- a. Seek clarification with the data custodian, and if necessary the INSPIRE national contact point, as to why the data set is not included in the monitoring report.
- b. Check whether the data set is documented with metadata in the INSPIRE geoportal (i.e. is it delivered through a well-known INSPIRE discovery service).

i. Yes

1. Check if the metadata record is complete
2. If the data set metadata includes a reference to a view service
 - a. Check compliance (using the Resource Browser)
 - b. Check if there are any restrictions on accessing the service

3. If the data set metadata includes a reference to a download service
 - a. Check compliance (using the Resource Browser)
 - b. Check if there are any restrictions on accessing the service
- ii. No
 1. Check if metadata on the data set is available in the national geoportal or discovery service

3. GENERAL FINDINGS

3.1 General observations

During a first round, the comparison of the Monitoring and Reporting results for the year 2012, delivered in May 2013², and the results from the first tests using the resource browser revealed the following:

1. Several countries did not define a discovery service as an endpoint in the EU geoportal. As a consequence none of the reported metadata records and services could be found. In total 6 countries were in this situation at the time of testing (BG, CY, HU, IT, LT and MT)³. This is further explained in the in-depth analysis of the discovery services (see section 3.2.1).
2. There still exists confusion / misunderstanding on how to report the spatial data sets and services. Especially the services are not always carefully documented. Many 'services' are in reality e.g. URLs to portals or mapping applications⁴. As a consequence, the number of reported resources in the Monitoring and Reporting are sometimes over-estimated.
3. Some of the services tested could not be reached because they are behind an access mechanism or firewall that does not allow reaching and using them. This is a particular point of attention for the harvesting: only metadata can be seen, but the services can't be accessed / used and therefore they could not be tested on conformity. The reasons for 'hiding' these services have been explored by contacting in some cases data and service providers or national contact points.
4. Many of the resources described in the monitoring and reporting sheets can be found, but have different 'names' in the metadata found in the geoportal. This made linking of corresponding resources sometimes cumbersome. This could be solved in the future by extracting the Monitoring & Reporting list from the catalogue and complementing it with other resources that are not yet documented in a catalogue.
5. In general terms, there are still important difference between the spatial data sets and services listed in the monitoring and reporting, and the ones that can be found in the European geoportal. Moreover, the figures are changing regularly. It means that when using the resource browser one day, there can be (important) differences the other day (for various reasons).

² In practice corresponding to the status of early 2013

³ One country, HR is not included in the analysis: they have not yet performed an M&R exercise and have only a few resources in the European INSPIRE portal. Some general information from the Croatian authorities is included in this report. Croatia plans to prepare a full M&R exercise between April-June 2014.

⁴ Of course, these links provide also interesting information, but could not be used to link the reported 'service' to a resource in the European INSPIRE portal.

Example of the fluctuation of resources	
<p>Austria</p> <ul style="list-style-type: none"> • 05.3 2305 Results • 10.3 2202 Results • 11.3 2286 Results, after 19:30: 1124 • 13.3 2287 Results • 14.3 2396 Results 	<p>Saxony (Germany)</p> <ul style="list-style-type: none"> • 15.01 95 Results • 17-18.1 Portal not available • 06.2 2 Results • 21.02 139 Results • 04.03 no results, only France available • 05.03 29 Results, all Germany only 10961 • 10.03 140 Results, all Germany 40336 • 13.03 134 Results, all Germany 40634 • 22.03 49 Results, all Germany 32358

6. Overall, there are also big differences between countries: while some countries such as ES, DE, FR, IT and to a lesser degree UK, have huge numbers of INSPIRE data sets and services, some countries seem to base their INSPIRE infrastructure on a limited number of data sets and services (e.g. DK, EE), at least for the time being.

Table 1 provides an overview of the number of spatial data sets (and series) and services for each of the Member States and for three countries of the European Economic Area. What is striking is that the numbers reported by the resource browser are much higher than the one reported through the official monitoring and reporting. There are various reasons to explain this:

1. Poland (93.188 data sets) is a particular case since the number of data sets is influenced by the way they are organized, i.e. following a sheet / tiling mechanism. In reality many of those data sets belong to data set series.
2. The case of Spain (107.759) is also particular in the sense that many regional and local data sets are described in the catalogue(s). It is clear that Spain tried to include as many data sets and services as possible.
3. For other countries the difference is much smaller, but not always clear: e.g. Germany, France, the Czech Republic, UK and Latvia have a multitude of data sets in the EU geoportal as compared to what is described officially in the M&R. The number of services for Germany in the EU geoportal is quite impressive (17.674)! We assume that for those countries also non-INSPIRE data sets and services are described in their catalogues, even if they are not considered 'part of' INSPIRE.
4. The opposite is true for a series of other countries such as LU, PT, BE, IE and SI. This is mainly due to the fact that not all catalogues are harvested and/or the status of implementation is reported too optimistically in the INSPIRE M&R.

Further analysis in the next sections will allow explaining the real situation and the reasons behind.

Table 1: Number of reported spatial data sets and services as compared to the number of data sets and services found through the European geoportal

Country	Monitoring & Reporting		EU Geoportal		Sample	
	# Spatial data Sets	# Services	# Spatial data Sets	# Services	# Spatial data Sets	# Services
AT	298	68	616	220	75	20
BE	316	76	180	23	31	6
BG	476	73	0	0	0	0
CY	230	21	0	0	0	0
CZ	227	189	1024	307	23	16
DE	2860	1174	6803	17674	119	92
DK	20	43	266	219	5	10
EE	35	17	29	26	5	8
ES	3514	2465	107759	1510	62	40
FI	270	57	416	96	30	13
FR	3217	809	8146	1614	47	18
GR	630	45	27	3	20	6
HR	0	0	4	4	0	0
HU	88	32	0	0	0	0
IE	150	26	36	22	29	13
IT	2147	920	0	0	0	0
LT	105	98	0	0	0	0
LU	204	111	29	19	14	11
LV	136	36	2812	18	14	8
MT	9	0	0	0	0	0
NL	141	186	112	403	13	13
PL	65	62	93188	21	12	10
PT	790	156	511	7	63	17
RO	208	62	197	4	21	7
SE	290	120	223	201	29	12
SI	86	29	63	2	10	7
SK	195	0	177	38	19	8
UK	1117	114	4026	440	111	17
IS	48	12	84	4	0	0
LI	64	2	0	0	0	0
NO	202	85	120	64	0	0
	18138	7088	226848	22939	752	352

3.2 Results of the testing

The testing was done in three steps described in chapter 2. Before carrying out the step-by-step testing of the sample spatial data sets and services, the different discovery services were analyzed.

3.2.1 Analyzing discovery services

3.2.1.1 General observations

Table 2 gives an overview of the number of discovery services as reported in the Monitoring and Reporting compared to the number of discovery services that can be found in the EU geo-portal. We should make distinction between the discovery or catalogue service(s) (CSW) that have been defined by Member States as endpoint in the EU-portal (see figure 1) and other discovery services that are reported and/or documented in the catalogues of the Member States. The first are harvested by the EU geoportal, the latter not. Some Member States have more than one endpoint defined (AT, BE), while others did not (yet) define a discovery service as endpoint (see further).

geoland.at CSW	AT	discovery	29-May-12
INSPIRE Geo-Portal Katalogservice BMLFUW/Österreich	AT	discovery	14-Nov-13
GeoCatalogue de la Région de Bruxelles-Capitale	BE	discovery	04-Jan-12
Geopunt-Metadatabase zoekdienst	BE	discovery	30-Jan-14
Czech republic INSPIRE metadata catalogue	CZ	discovery	03-Nov-11
GeoDatenKatalog.De	DE	discovery	09-Jul-13
DK Service	DK	discovery	03-Nov-11
Estonia Discovery Service	EE	discovery	16-Jan-14
KATAΛOΓOΣ	EL	discovery	09-Oct-13
IDEE Discovery service	ES	discovery	17-Oct-13
Paikkatietohakemisto	FI	discovery	12-Mar-13
Geocatalogue Catalogue Server INSPIRE	FR	discovery	11-Oct-12
Pilot kataloškog servera	HR	discovery	21-Feb-14
Geoportal IE - INSPIRE Discovery Service	IE	discovery	12-Sep-13
Iceland Service	IS	discovery	18-Nov-13
INSPIRE Geoportal CSW of the Grand-Duché of Luxembourg	LU	discovery	10-Nov-11
ArcGIS Server Geoportal Extension 10 - OGC CSW 2.0.2 ISO AP	LV	discovery	29-Nov-11
Latvian metadata catalogue. GDC (Geospatial data connector)	LV	discovery	26-Nov-13
Nationaal GeoRegister	NL	discovery	03-Nov-11
Geonorge - National CSW service for Norway	NO	discovery	07-Feb-14
INSPIRE-PT Catalog Service	PT	discovery	10-Jan-12
ArcGIS Server Geoportal Extension 10 - OGC CSW 2.0.2 ISO AP	RO	discovery	03-Nov-11
Nationell svensk metadata katalog	SE	discovery	17-Dec-13
Slovenski Inspire metadata katalog	SI	discovery	14-Sep-12
Katalógová (vyhľadávacia) služba MŽP SR	SK	discovery	03-Nov-11
UK Service	UK	discovery	03-Nov-11

Figure 2: the discovery services defined as an endpoint in the EU-geoportal (status April 2014)

The INSPIRE evaluation experts looked into all the discovery services listed in the Monitoring and Reporting sheets, made a selection, and tried to find them back in the EU-geoportal and also analyzed the discovery services that are not listed in the Monitoring and Reporting, but can be found back in the EU geo-portal.

There are important differences between the discovery services listed in the Monitoring and Reporting sheets as compared to the discovery services that can be found back in the EU-geoportal. Understanding these differences helps also to understand the technological and organizational set-ups in the Member States.

Table 2: number of discovery services in the Monitoring and Reporting and in the geoportal and number of discovery services checked/tested

Country	# Discovery Services (M&R)	# Discovery Services (geoportal)	Checked	Country	# Discovery Services (M&R)	# Discovery Services (geoportal)	Checked
AT	5	4	5	IE	1	1	1
BE	11	2	11	IT	78	0	0
BG	15	0	15	LT	39	0	0
CY	10	0	10	LU	6	6	6
CZ	7	23	23	LV	2	1	1
DE	4	2	4	MT	0	0	0
DK	4	3	4	NL	1	1	1
EE	1	4	4	PL	3	18	3
GR	11	1	11	PT	2	1	2
ES	20	11	20	RO	11	1	11
FI	1	3	1	SE	1	1	1
FR	3	3	3	SI	5	1	5
HR	0	1	1	SK	4	2	4
HU	0	0	0	UK	1	1	1
					246	91	148

We can make following observations regarding the discovery services:

1. There are 6 Member States that did not (yet) define a discovery / catalogue service as an endpoint in the EU-geoportal: BG, CY, HU, IT, LT and MT. This does not mean that they don't have such a service. For example Hungary, Portugal and Lithuania have a long SDI tradition and a rich set of SDI components including spatial data sets, services, a geo-portal and catalogue services exposing metadata records. Cyprus said not to have a discovery service yet. The Department of Lands and Surveys (DLS) plans to proceed with more online e-applications to the public through the "Government Gateway" (mid 2014), as well as to develop the "DLS Portal" which is expected to go online, beginning of 2015. In other countries, only part of the territory is covered. In the case of Belgium, two separate discovery services are defined as an endpoint: one from the Flemish Region and another from the Brussels Region. The Walloon and Federal catalogues exist, but are missing. Portugal did originally not report a discovery service⁵. During the evaluation exercise the testing team got access to the spreadsheet version of the M&R which contained 2 discovery services (there is a CSW in the European geoportal, but this one is not 'recognized' as discovery service).
2. It is not always clear if the national discovery / catalogue service is a service that harvests all the relevant catalogues in the country. In Germany for

⁵

http://snig.igeo.pt/Inspire/documentos/monitorizacaoRelatorios/M&R2013/MR_indicators_PT2013_Indicadores.pdf

example 32 catalogues are harvested by the national geoportal bringing all the metadata records for spatial data sets and services of the Länder and thematic communities together in one catalogue. The discovery service build on top of this consolidated catalogue is defined as an endpoint in the EU geo-portal. In the Czech Republic, one discovery service is registered at the INSPIRE geoportal. This national discovery service is harvesting 23 CSW services. But some of these CSW are not reported in the Monitoring & Reporting report of CZ. Some countries have defined one of their discovery services as the endpoint in the EU geo-portal, although it is a discovery service of only one (important) spatial data provider. For example in Romania, the endpoint is the catalogue service of ANCPI, the Romanian Mapping Agency. However this service is not harvesting (yet) the catalogue of other stakeholders such as the one of the Ministry of Environment.

3. An important number of the reported discovery services are in practice no services but they rather refer to URLs of a geo-portal, or to web mapping applications. This explains why some Member States have many discovery services in the monitoring sheets, but a lot less discovery services can be found back in the EU geo-portal. For example, GR and RO report 11 discovery services, but in the EU portal there are only two. The situation is similar in SI and SK.
4. There is a series of countries that have only one discovery service reported and one that can be found in the EU-geoportal, even if they have more such services. This means that the metadata records of these other discovery services are not described in the catalogue(s). This is a clear attempt to make the monitoring and management of catalogues as simple as possible. This is certainly the case for countries such as IE, NL, SE and UK. In DE, 2 discovery services are monitored, while 4 services can be found back in the EU geoportal. The 32 discovery services that are harvested can't be found back: not in the monitoring sheet, nor in the EU geoportal.

3.2.1.2 Results of the tests of the discovery services

All the described discovery services reported in the INSPIRE M&R were analyzed, while all the discovery services that could be found through the EU geo-portal were tested. The results are summarized in table 3. As can be concluded from the table only 13 tested services or 21% passed the tests: BE (1/2), FI (1/1), HR (1/1), IE (1/1), PL (6/18), RO (1/1), SI (1/1) and UK (1/1).

Country	# Discovery Services tested	# Discovery services passing the tests	Types of issues / errors
AT	4	0	One results in several validation errors due to incomplete metadata, another results in an incomplete capability response; for both one of the keyword values does not match the required simple type
BE	2	1	The discovery service of the Flemish Region passed the tests; The one from the Brussels region not: multiple creation dates specified
BG	0	0	Not possible to test
CY	0	0	Not possible to test
CZ	4	0	Several schema validation issues: e.g. The content "gml:Envelope" of element <ogc: GeometryOperand> does not match the required simple type; Several INSPIRE validation issues: e.g. The INSPIRE Extended Capabilities element could not be read, The service does not declare to support the AP ISO Application Profile 1.0.0, The service does not declare to support the following required ISO queryable(s): OrganisationName
DE	2	0	For one the element Keywords is incomplete, the other could not be interpreted as OGC CSW
DK	3	0	INSPIRE Validation Issues: Several metadata elements missing; for the third discovery service several INSPIRE Validation Issues exist as well: The Coupled Resource (operatesOn)URL "" is invalid because Malformed URL, The Get Discovery Service Metadata Response has validation issues, The metadata element "Coupled Resource" is missing, empty or incomplete
EE	4	0	First discovery service - Schema Validation Issues: e.g. The content "" of element <URL> does not match the required simple type; INSPIRE Validation Issues: metadata elements missing or incomplete // The three other discovery services have similar issues: URL response could not be interpreted as an OGC CSW version 2.0.2 capabilities document, no valid URL
GR	1	0	Several schema validation issues: e.g. The content "LessThanOrEqualTo" of element <ComparisonOperator> does not match the required simple type; INSPIRE validation issue: The metadata element "Responsible Organisation" is missing, empty or incomplete but it is required
ES	11	0	The content of some metadata elements do not match the simple type; some metadata are missing or are incomplete and The Get Discovery Service Metadata Response has validation issues
FI	1	1	No compliancy issues
FR	1	0	Responsible organisation is missing/content type errors
HR	1	1	No compliancy issues
HU	0	0	Not possible to test
IE	1	1	No compliancy issues
IT	0	0	Not possible to test
LT	0	0	Not possible to test
LU	1	0	Coupled resource is missing

Country	# Discovery Services tested	# Discovery services passing the tests	Types of issues / errors
LV	1	0	Several schema validation issues: e.g. The content "" of element <URL> does not match the required simple type; Many INSPIRE validation issues: e.g. Several metadata elements are missing, the INSPIRE Extended Capabilities element could not be read
MT	0	0	Not possible to test
NL	1	0	Several INSPIRE validation issues: The metadata element "Conditions For Access And Use" is missing, empty or incomplete, the content of some metadata elements does not match the required simple type
PL	18	6	The discovery services of the national geoportal do not have errors. Other discovery services, such as those from the Statistical Institute have some INSPIRE validation issues: e.g. The service does not declare to support the following required ISO queryable(s): Type, Title, and Abstract. Yet other discovery services have no valid resource locator and could not be reached
PT	1	0	Not recognised as a discovery service although it is a CSW 2,0,2. It has a schema validation issue: Unknown type {gml:TimePeriodType} specified in xsi:type attribute; It has many INSPIRE validation issues: INSPIRE Extended Capabilities element could not be read and most metadata elements are missing
RO	1	1	No compliancy issues
SE	1	0	Several INSPIRE validation issues: the content of some metadata elements does not match the required simple type
SI	1	1	No compliancy issues
SK	2	0	The first discovery service has a INSPIRE validation issue: The Get Discovery Service Metadata Response has validation issues and there are several warnings as well; the second service has an INSPIRE validation issue as well: The URL "" is not valid
UK	1	1	No compliancy issues
	63	13	21% of all the discovery services pass the test

Table 3: number of discovery services and the major type of issues and errors encountered during testing

Following observations can be made:

1. Only few discovery services can't be reached (there are some in the case of PL). On the other hand in some cases the URL is not valid (PL, SK) or malformed (DK);
2. In most cases the metadata elements are incomplete, e.g. conditions for access and use, (AT, NL), while in other cases metadata elements are missing (LV); or the Get Discovery Service Metadata Response has validation issues (ES);

3. For some of the discovery services the INSPIRE Extended Capabilities element could not be read (CZ), or the service does not declare to support the AP ISO Application Profile 1.0.0 (CZ), or the service can't be interpreted as an OGC CSW service (DE, EE);
4. Moreover the content of some of the metadata data elements often do not match the simple type: e.g. for the URL, for keywords ... (AT, LV);
5. Finally, some discovery services have very specific smaller errors: e.g. multiple creation dates specified (BE, Brussels).

In general terms, most of these issues can be solved relatively easy and it does not necessary mean that the services are not doing their 'job' (providing access to metadata records).

3.2.2 Testing the spatial data sets

Table 4: Results for the controlled and tested spatial data sets and their metadata records

Country	# Data sets tested from MR	# Data sets in portal	% of data sets in portal	# Data sets without issues on metadata	% of metadata records without problems	Types of issues / errors
AT	75	35	46,67	6	17,14	The name of the data resource is different. Metadata elements missing (or incomplete), especially the conformity information, and to a lesser degree the keyword element (wrong content); for three data sets there are corresponding view and downloadservices in the national portal, but these are not linked with the INSPIRE theme
BE	31	16	51,61	11	68,75	Metadata elements are missing (or incomplete): conformity (4) and conditions of use (1)
CZ	23	17	73,91	3	17,65	Metadata elements are missing (or incomplete): conformity (13), URI (1), INSPIRE spatial data themes (1) and Limitations of acces (1) // several errors against XML schema (12), e.g. Attribute @id is not allowed on element UnitDefinition>, Required attribute @{http://www.opengis.net/gml}id is missing
DE	119	61	51,26	4	6,56	Metadata elements missing or not found: conformity declaration not found (23), or with errors (14); access limitation element nor found (1) or not correct (2); missing or wrong reference to INSPIRE themes (6), invalid URL (1); 3 data sets with many metadata issues
DK	5	5	100,00	0	0,00	One data set has schema validation issues: The content "" of element <DateTime> does not match the required simple type // Conformity element missing (5); The metadata element "Resource Locator" is missing, empty or incomplete (2); Limitations on Public Access and Temporal Reference missing (1)
EE	5	4	80,00	2	50,00	One general metadata record was introduced for the Estonian topographic database "Eesti topograafia andmekogu" - This database contains different datasets from different themes --> so we would expect metadata records for each dataset included in the database. "Conformity" is missing, empty or incomplete (2)
ES	62	31	50,00	7	22,58	Metadata elements missing: e.g. Conformity, Limitations public access; invalid URLs
FI	30	27	90,00	23	85,19	Metadata element conformity missing (1); element CRS incomplete (1); error in URL (1)// Some data sets have warnings regarding the URL (9)
FR	47	37	78,72	0	0,00	Metadata elements missing or incomplete: conformity (36), theme (14), temporal reference (9), metadata date (21), conditions of access (6), limiting public access (3), lineage (3), but also point of contact, responsible organisation and bounding box (1); several schema validation issues (20)
GR	20	3	15,00	0	0,00	Several schema validation issues for one of the data sets: e.g. The content model does not allow element <gmd:identifier> to appear here; "Conformity" is missing, empty or incomplete (3)
IE	29	6	20,69	4	66,67	Conformity metadata is missing (2)

LU	14	4	28,57	3	75,00	Conformity metadata is missing (4), bounding box is missing (1)
LV	14	4	28,57	2	50,00	Conformity metadata is missing or incomplete (2)
NL	13	9	69,23	0	0,00	Conformity metadata missing (9), URL and theme (1) are missing
PL	12	4	33,33	0	0,00	The metadata element "Conformity" is missing, empty or incomplete but it is required
PT	63	19	30,16	0	0,00	Errors mostly relate to metadata elements that are missing: conformity, conditions of access&use, limitation on public access, resources locator missing
RO	21	9	42,86	3	33,33	Conformity is missing, empty or incomplete (6), only 1 has a view service
SE	29	24	82,76	10	41,67	Schema validation issues: e.g. The content of element <MD_Resolution> is incomplete; The content model for element <verticalCRS> does not allow character content // INSPIRE validation issues, very different depending the resource: e.g. Resource Locator is missing; The metadata element "Styles with Title and Unique Identifier (OGC:Name)" is missing, empty or incomplete; topic category missing
SI	10	4	40,00	0	0,00	Several schema validation issues: e.g.: the content "" of element <Date> does not match the required simple type (3); conformity element missing (1)
SK	19	15	78,95	2	13,33	Metadata data elements missing or incomplete: conformity missing (13), limitations (3), conditions (3), URL missing or incomplete (2), theme (3)
UK	111	94	84,68	19	20,21	Conformity metadata missing (74), theme missing or errors in the theme (12), limitations to public access missing (6), Conditions of use missing (4); several other small issues; not always clear if we speak about the same resource
	752	428	56,91	99	23,13	

3.2.2.1 General observations

Table 4 provides an overview of the spatial data sets that can be found back in the EU geo-portal. Following observations can be made.

1. From the 752 selected data sets reported by the Member States in the INSPIRE Monitoring & Reporting, almost 57% could be found back through the EU geo-portal. The figures vary from 15% for GR to 90% for FI⁶. Spatial data resources not found back are analyzed further in section 3.4.
2. The metadata records of the spatial data resources found in the EU-geoportal were tested: 23% have compliant metadata. This varies between 0% for FR and 85% for FI. This low mark for the metadata does not mean there are major issues or that the quality of the metadata is bad. The errors vary from one missing element to more missing elements and errors during the schema validation. This is discussed in section 3.2.2.2.

⁶ Denmark has 100%, but very few data sets are reported/in the portal and few were tested.

3.2.2.2 Issues/errors in metadata for spatial data

The type of issues / errors that can be observed can be summarized as follows:

1. The conformity element is very often missing or not completed. This seems to be 'normal' since many Member States did not yet test conformity of the spatial data sets and therefore leave this metadata element open. If we would take out this element from the analysis, it is expected that the compliancy rate would rise to 70% or more.
2. Nevertheless, many other metadata elements are sometimes missing:
 - Condition of use
 - Limitations of public access
 - Missing INSPIRE themes / keywords covered
 - Invalid URLs and URL issues
 - Incomplete CRS (1)
 - Missing bounding box (1)
3. There remains also several schema validation issues reported that needs particular attention (CZ, DK, GR, SE, SI).
4. Finally, in many cases there is some confusion about the different data sources found in the INSPIRE M&R and their counterpart in the EU geo-portal. Each expert had to test/verify if one can speak about the same resource. As said before, this could be solved in the future by generating the INSPIRE M&R list from the catalogue and to build further on that.

3.2.2.3 Spatial data and service availability/accessibility

Information has been collected on services availability and accessibility for all the spatial data sets tested. For each data set it was checked whether it is viewable and downloadable through a service, and whether this service could be accessed. Table 5 provides an overview of the number of available view and download services that could be found back in the metadata, and that were available and accessible in practice.

From the 428 spatial data sets found back in the INSPIRE geoportal 172 have a view service (40%), while 62 have also a download service (almost 15%). From the view services 58% could be accessed, from the download services this was almost 60%. There are however important differences between Member States. While PT and SI have no viewing services for their tested data set records, GR has a view service for each of its tested data set records found in the INSPIRE portal. For 11 countries no download service could be found for the tested data, while all the tested data sets records have a download service in BE, DK, FR and NL.

Country	# Data sets tested from MR	# Data sets in portal	% of data sets in portal	# Data sets with view service	% Data sets with view service	# Data sets with accessible	% Data sets with accessible view service	# Data sets with download service	% Data sets with download service	# Data sets with accessible download service	% Data sets with accessible download service
AT	75	35	46,67	16	45,71	13	81,25	4	11,43	3	75,00
BE	31	16	51,61	3	18,75	3	100,00	7	43,75	7	100,00
CZ	23	17	73,91	8	47,06	7	87,50	3	17,65	2	66,67
DE	119	61	51,26	35	57,38	11	31,43	0	0,00	-	-
DK	5	5	100,00	3	60,00	3	100,00	3	60,00	3	100,00
EE	5	4	80,00	2	50,00	2	100,00	0	0,00	-	-
ES	62	31	50,00	7	22,58	7	100,00	0	0,00	-	-
FI	30	27	90,00	10	37,04	6	60,00	5	18,52	2	40,00
FR	47	37	78,72	19	51,35	15	78,95	10	27,03	10	100,00
GR	20	3	15,00	3	100,00		0,00	0	0,00	-	-
IE	29	6	20,69	1	16,67	0	0,00	0	0,00	-	-
LU	14	4	28,57	3	75,00	2	66,67	0	0,00	-	-
LV	14	4	28,57	3	75,00	0	0,00	0	0,00	-	-
NL	13	9	69,23	7	77,78	5	71,43	6	66,67	6	100,00
PL	12	4	33,33	3	75,00	2	66,67	3	75,00	0	0,00
PT	63	19	30,16	0	0,00	-	-	0	0,00	-	-
RO	21	9	42,86	1	11,11	1	100,00	0	0,00	-	-
SE	29	24	82,76	12	50,00	8	66,67	5	20,83	4	80,00
SI	10	4	40,00	0	0,00	-	-	0	0,00	-	-
SK	19	15	78,95	2	13,33	2	100,00	0	0,00	-	-
UK	111	94	84,68	34	36,17	13	38,24	16	17,02	0	0,00
	752	428	56,91	172	40,19	100	58,14	62	14,49	37	59,68

Table 5: Spatial data sets and available/accessible view and download services

3.2.3 Testing the services

The view and download services have been checked and tested in a similar way as the spatial data sets. Table 6 provides an overview of the number of view and download services checked and tested, whether they can be found back through the EU geo-portal, they are accessible, and whether their metadata, as well as the services themselves are conformant.

INSPIRE Evaluation: Summary of findings for EU Member States

Country	# View services	# Download services	# Services tested from MR	# Services in portal	% of services in portal	# Services with complete metadata	% of metadata records without problems	# Services compliant	% of compliant services	# Services accessible	% accessible services	Types of issues / errors
AT	12	8	20	14	70,00	0	0,00	1	7,14	4	28,57	Different type of issues: GetCapabilities works but no getMap or getMap is not conformant but works with GIS (2), metadata elements layer and URI missing, invalid URLs (3) // Download services could not be tested since not reachable (service comes with a cost)
BE	5	1	6	2	33,33	0	0,00	0	0,00	2	100,00	Several issues with the two services found in the EU geo-portal: getMap operation metadata, layers and image format
CZ	11	5	16	11	68,75	9	81,82	0	0,00	9	81,82	Metadata elements are missing or incomplete: Responsible Organisation (4), conformity (2); Errors against validation schema: invalid NCNames // The metadata element "Service category or subcategory as per Part D.4. of the INSPIRE Metadata Regulation" is missing, empty or incomplete. Some of the download services can't be reached (one with error XML schema)
DE	76	16	92	27	29,35	4	14,81	0	0,00	11	40,74	Many of the services did not work properly at the day of testing // none of the download services can be accessed directly // The metadata have many validation issues, conformity missing // Many service validation issues, capabilities document could often not be interpreted
DK	5	5	10	6	60,00	0	0,00	0	0,00	4	66,67	The metadata element "Coupled Resource" is missing, empty or incomplete // Inspire Validation Issues: The Coupled Resource (operatesOn)URL "" is invalid because Malformed URL, One or more layers failed the INSPIRE validation, The Get View Service and the Get Download Service Metadata Response has validation issues
EE	5	3	8	7	87,50	2	28,57	0	0,00	7	100,00	Several metadata issues on the layers; metadata elements missing (e.g. Responsible organisation) // Layers needing review; one or more layers failed the INSPIRE validation; one schema validation issue: The content "" of element <URL> does not match the required simple type
ES	24	16	40	6	15,00	0	0,00	0	0,00	5	83,33	Several errors when validating the view services; The URL link in the metadata for the download service tested is not correct (but there are no restrictions)// Two of the view services have restricted access (copyright, all rights reserved), but other have no restrictions at all (even not for re-use)

INSPIRE Evaluation: Summary of findings for EU Member States

Country	# View services	# Download services	# Services tested from MR	# Services in portal	% of services in portal	# Services with complete metadata	% of metadata records without problems	# Services compliant	% of compliant services	# Services accessible	% accessible services	Types of issues / errors
FI	8	5	13	10	76,92	10	100,00	0	0,00	3	30,00	One or more layers failed the INSPIRE validation, The Get View Service Metadata Response has validation issues // Most of the services need authentication/authorization
FR	13	5	18	15	83,33	0	0,00	1	6,67	14	93,33	For some services the WMS exist, but the url recorded in the metadata doesn't allow to get the capabilities, the service is accessible in software applications; some URLs don't work (getcapabilities request delivers capabilities with another online resource url or redirects to a ZIP file for the download service); None of the services is compliant due to several errors: e.g. malformed URL, layers failing validation, ...
GR	5	1	6	2	33,33	0	0,00	0	0,00	2	100,00	One service has metadata issues - Malformed URL, missing information (limitations on public access, coupled resource); the two services have compliancy issues: for one, the Get View Service Metadata Response has validation issues and the other service has one or more layers failed the INSPIRE validation
IE	8	5	13	3	23,08	0	0,00	0	0,00	3	100,00	Several issues with the metadata and compliance of the services
LU	6	5	11	2	18,18	2	100,00	0	0,00	2	100,00	The services have metadata; Inspire Validation Issues: One or more layers failed the INSPIRE validation/The Get View Service Metadata Response has validation issues; the get download service metadata response has validation issues
LV	5	3	8	3	37,50	0	0,00	0	0,00	0	0,00	All WMS and WFS services are payment services and could not be accessed // Problems with WMS and WFS URL
NL	8	5	13	8	61,54	5	62,50	4	50,00	8	100,00	Inspire Validation Issues: One or more layers failed the INSPIRE validation, The Get View Service Metadata Response has validation issues (1); Regarding the metadata: layer (2) and responsible organisation (1) is missing, for the compliant download service the metadata element "Get Download Service Metadata Operation Metadata/Get Spatial Dataset Operation Metadata/Get Describe Spatial Dataset Operation Metadata/Get Link Download Service Operation Metadata/Spatial Datasets Metadata is missing
PL	7	3	10	0	0,00	0	0,00	0	0,00	0	0,00	There are 54 view services reported in the monitoring report, only 26 view services appear in the INSPIRE geoportal among which some duplicates. All the services reported on the server: http://ikar2.pgi.gov.pl/ are not accessible // The links to the download services are no real download services. 4 of the checked services could be accessed via the national portal.

Country	# View services	# Download services	# Services tested from MR	# Services in portal	% of services in portal	# Services with complete metadata	% of metadata records without problems	# Services compliant	% of compliant services	# Services accessible	% accessible services	Types of issues / errors
PT	13	4	17	2	11,76	0	0,00	0	0,00	0	0,00	The WMS link in the metadata is not correct, not tested // metadata elements missing
RO	5	2	7	1	14,29	0	0,00	0	0,00	0	0,00	The WMS could be tested, but has several metadata elements missing and is timed out, several validation issues
SE	8	4	12	11	91,67	4	36,36	1	9,09	7	63,64	Metadata issues: Schema validation issues: e.g. Schema Validation Issues The content "År 1991" of element <Date> does not match the required simple type. INSPIRE Validation issues: e.g. One or more layers failed the INSPIRE validation; The metadata element "Coupled Resource" is missing, empty or incomplete. Missing metadata elements. Layers that fail the INSPIRE validation. One download points to a zip file // Several services require authentication
SI	5	2	7	1	14,29	0	0,00	0	0,00	0	0,00	The view service found back is not a viewing service // Other services in the INSPIRE portal are not responding and/or have many validation issues // other reported services were not responding either
SK	5	3	8	0	0,00	0	0,00	0	0,00	0	0,00	Testing was not possible since the name/URL is not given in the monitoring, no response yet at the time of writing the report.
UK	15	2	17	13	76,47	0	0,00	0	0,00	9	69,23	Several services have incomplete metadata, some have wrong URLs
	249	103	352	144	40,91	36	25,00	7	4,86	90	62,50	

Table 6: number of services checked / tested, their occurrence in the EU-portal, and their accessibility and compliancy

3.2.3.1 General observations

We can make the following general observations regarding the services:

1. From the 352 checked and tested services 249 are view services and 103 are download services. Out of these 41 % can be found back in the EU geo-portal (144). The results range from 0% for PL up to 91% for SE. Section 3.2.4 provides more information on services found back on national or other geo-portals. SK is a special case: the M&R does not contain a name, neither a URL (the NCP said that solving the problem will take some time).
2. From the services that could be found back 62% (90) could be accessed. This ranges from 0% for e.g. PL, SK up to 100% for BE, IE, LU and NL. Some of the services can't be accessed because the URL is not functioning properly (at least at the time of testing), or access is regulated through authentication/authorization mechanisms.⁷ This is for example the case for countries such as AT, CZ, ES, FI, LV and SE, usually for download services, but it exists also for some view services. This is for example the case for the services of the national mapping agency of LV (basic topographic data), and for a WMS for cadaster data in Luxemburg that can be found in the national geo-portal (see as an example the comment in the box below)

Example of controlled access – WMS of cadaster data (Luxembourg)

“Webservices concerning the cadastral parcels need to be protected because the cadastral map dataset is ruled by a law which requires fees and fixes certain access conditions. And a second reason is that the Agency does not think it is wise to permit the general public to combine the cadastral parcel data with other, precise, geodata like e.g. orthophotos, because of the partially lacking geometric precision of this data. If these webservices were freely usable, this combination would be possible for everybody, also for those who do not have the knowledge to interpret these shifts in parcel limits. It is however formulated in our law that state level bodies receive this data for free. They can also get access to the corresponding web services. The EU bodies mentioned by INSPIRE are considered as the same level, so if they ask for access to the data, this will be no problem.”

3. From all the tested services of the EU geo-portal, only 25% have compliant metadata and less than 5% of these services are compliant themselves. Many countries have still important work to do regarding the metadata for services: in seven countries all the services fail from that perspective (AT, BE, ES, FR, IE and UK). Only 6 services from AT (1), FR (1) and NL (4) pass the compliance tests

3.2.3.2 Issues and errors regarding services

The type of issues / errors that can be observed can be summarized as follows:

⁷ Services might be simply behind firewalls without such systems. Also payment mechanisms might be part of such solutions.

1. GetCapabilities usually work with a few exceptions. However, getMap is not always working, or it works (when testing in a GIS like Q-GIS) but it is not compliant.
2. There are problems with some of the layers of the services.
3. There are problems with malformed URLs making them not to work.
4. Several services have schema validation issues.
5. Finally, most problems relate to missing or incomplete metadata elements
 - Missing or incomplete URLs, URIs
 - Missing responsible organization
 - Missing layer information
 - Missing service category

3.2.4 Resources in the Member States, not found at EU level

Some resources can be found at the national level, in national, sub-national or other portals, while they are not found in the European geo-portal and/or they are not monitored. We checked first why some of the countries are not visible at all at the European level (no resources found in the European geo-portal), then we check the degree to which certain spatial data sets and services can be found in the national geo-portal, but not in the European geo-portal. Finally we also explore why spatial data and services can't be found in the INSPIRE portal, nor in the M&R. For the latter we provide some examples.

3.2.4.1 Member states not visible at the European level

Six Member States have no spatial data or services described in the portal although they describe resources in the M&R. Some examples of feedback given by the Member States that explain the situation in the Member State concerned⁸:

Bulgaria – There has been a restructuring of the Ministry of Transport, Information Technology and Communication. The Directorate in which the INSPIRE NCP was situated was closed down and there is not yet a replacement. Regarding the catalogue and catalogue services, following explanation was recorded *“The project on which we rely for the information that you require reached the stage of public procurement for selection of a contractor. The contractor was selected but the decision was appealed and now we are waiting for the court’s ruling. Unfortunately, we have not started the preliminary work on the establishment of these catalogues due to impossibility of creating an expert working group on these issues.”*

Cyprus – Work was in priority focusing on the metadata for the spatial data sets. Very limited experience has been gained to set-up services (most of the reported services are applications, not services). There is not yet a CSW which makes it difficult to expose the data sets and services. There is also not yet a national geoportal. Everything has been delayed among others because of the economic crisis. A portal of the Mapping Agency is foreseen early 2015.

⁸ Again, it should be stressed that this is the situation at the time of the evaluation was performed.

Hungary – There are discovery services from individual data providers, especially those from the mapping agency FÖMI (one for spatial data sets⁹ and one for services¹⁰), but they are not yet consolidated in one national CSW and thus not defined as an endpoint in the European INSPIRE portal. One of the reasons mentioned is that there is a lack of a coordinated approach. *“Because in Hungary the INSPIRE Committee is missing (the development is in progress), only the FÖMI (Hungarian NMA) INSPIRE services can be communicated”*. There seems to have taken place some communication with the JRC to define the FÖMI catalogue as endpoint, but no actions have been taken since December 2013.

Italy – Confirmation and a more in depth-explanation is still waited for. However, it is confirmed through several other communications that many spatial data and services exist in Italy, especially at the level of the regions. These can be found in Regional geoportals. The existence of many services has been confirmed during a crawling exercises performed by the University of Calgary that listed Italy in the top 10 (regarding number of services) in the world (2010). However there seem to be a lack of a coordinated approach. Tasks have been divided between the Ministry of Environment and the Ministry of Informatics, but a coordinated approach for publishing the data and services through the European geo-portal is not yet in place. The very last step to define the central CSW as endpoint is missing.

Lithuania – The NCP explained that *“the existing discovery service in Lithuanian (see www.geoportal.lt) is not compatible with INSPIRE requirements, therefore not defined as an endpoint in the EU geoportal. There is an ongoing project to support the development of Lithuanian spatial information infrastructure focusing on the implementation of tools for the INSPIRE directive. This project is expected to create Discovery, View, Download and Transformation services compatible with INSPIRE requirements and will also provide a discovery service to the European geoportal. So the INSPIRE geoportal will have access to Lithuania INSPIRE services as soon as the project will be finished”*.

Croatia is a specific case since they did not yet M&R to the Commission. A M&R system will be set-up. Following explanation was given by the NCP: *“... recently a pilot version of NSDI geoportal was established, but it is still in development phase. The final version of the NSDI geoportal with all the needed functionalities, also connected to INSPIRE geoportal, should be ready in the course of 2014. The current version of the geoportal contains a limited number of metadata; so we are in the phase of collecting metadata from NSDI subjects (organisations) and entering them through the metadata editor. There are also discovery and view services, and download services in very limited extent. Other services will be available soon, in the next months”*

⁹ <http://www.geoshop.hu/geonetwork/srv/csw?SERVICE=CSW&VERSION=2.0.2&REQUEST=GetCapabilities>

¹⁰ <http://inspire.fomi.hu/geonetwork/srv/eng/csw?SERVICE=CSW&VERSION=2.0.2&REQUEST=GetCapabilities>

3.2.4.2 Data and services in the national portal, not in the INSPIRE portal

Country	Sample					
	# Spatial data Sets	# Services	# Spatial data sets in national portal	% spatial data sets in national portal not in INSPIRE portal	# Services in national portal	% of services in national portal but not in INSPIRE portal
AT	75	20	1	1,33	2	10,00
BE	101	7	3	2,97	2	28,57
CZ	23	16	0	0,00	2	12,50
DE	101	50	38	37,62	8	16,00
DK	5	10	0	0,00	0	0,00
EE	5	8	0	0,00	0	0,00
ES	62	40	2	3,23	1	2,50
FI	30	13	0	0,00	0	0,00
FR	47	18	5	10,64	0	0,00
GR	21	6	0	0,00	1	16,67
HU	9	10	1	11,11	0	0,00
IE	29	25	7	24,14	4	16,00
IT	66	61	5	7,58	5	8,20
LU	14	11	9	64,29	8	72,73
LV	14	8	0	0,00	1	12,50
MT	9	0	5	55,56	-	-
NL	13	13	2	15,38	2	15,38
PL	8	10	0	0,00	4	40,00
PT	63	17	18	28,57	9	52,94
RO	21	7	0	0,00	0	0,00
SE	29	12	1	3,45	1	8,33
SI	10	7	0	0,00	0	0,00
SK	19	8	1	5,26	-	-
UK	111	23	8	7,21	0	0,00
	885	400	106	11,98	50	12,50

Table 7: Spatial data sets and services in the national (or similar portal), but not in the EU portal

As a first proxy of missing data and services the samples have been also checked on their appearance in the national (or similar portals), while not be found in the European INSPIRE portal. Table 6 provides an overview for the spatial data sets and services checked.

Following observations can be made:

1. Around 12% of the spatial data sets (from the sample) could be found in the national portal, while not available in the European INSPIRE portal. This ranges from LU for which 64% of the selected sample could be found in the national geo-portal, while not discoverable through the European one. For CZ, there were no spatial data found in the national portal that could not be found through the European geoportal.
2. A similar amount of services (12.5%) could be found in national geo-portals but not in the European geoportal. This amounts to 73% for LU, while FI, FR and UK have no services in the national portal that can't be found in the European geoportal (again this is based on the sample).

3.2.4.3 Data sets and services not reported

A systematic control of portals of data providers in the Member States to check whether some spatial data sets and services relevant for INSPIRE are not reported, nor made accessible through the European INSPIRE portal was very difficult. Therefore we include here some examples, rather than a systematic test.

AT - Austria

All themes are reported except:

- III.15 Oceanographic geographical features, III. 16 Sea regions
There are no data sets to report under these themes
- III.19 Species distribution

No data for these themes could be found in the European INSPIRE portal. No data found in the national portal either.

BE – Belgium

Flanders has encoded the spatial data sets that fall under INSPIRE and those that are not considered part of INSPIRE. Some of those data sets could be found in Geopunt, the Flemish geoportal. This is the explanation given by the Flemish Agency for Geographic Information: *“There might be indeed differences because not all data sets are considered INSPIRE data sets. The harvesting by the European portal is adapted to this based on a specific key-word “lijst_M&R_inspire”. Because not all spatial data sets have this keyword, some data sets and services might be missing in the EU portal.”* But in general terms, Belgium covers all the themes of the three annexes.

CZ – Czech Republic

Most of the data themes are reported. Missing themes are:

- I.2 Geographical Grid Systems

14 datasets could be found in the INSPIRE geoportal most of them with an extent limited to a region. A national grid dataset according the INSPIRE specifications could not be found in the INSPIRE geoportal.

Though a view service “INSPIREprohlížečská služba pro téma Zeměpisné soustavy souřadnicových sítí (GGS)” - http://geoportal.cuzk.cz/WMS_GRID_ETRS89_LAEA/WMSservice.aspx? could be found in the INSPIRE geoportal that shows geographical grid

data. The responsible organisation is “Český úřad zeměměřický a katastrální” (ČÚZK).

- III.10 Population distribution - demography

No datasets found in the INSPIRE geoportal. However, in the INSPIRE geoportal as well as in the National geoportal <http://geoportal.gov.cz/web/guest/map/> following map services were found showing “population distribution – demography” datasets:

- http://geoportal.gov.cz/ArcGIS/services/CENIA/cenia_hust_zalid/MapServer/WMSServer (population density)
- http://geoportal.gov.cz/ArcGIS/services/CENIA/cenia_obyv_byt/MapServer/WMSServer (population per dwelling)

For both services the responsible organisation is “Český statistický úřad” (ČSÚ).

- http://geoportal.gov.cz/ArcGIS/services/CENIA/cenia_typologie_krajiny/MapServer/WMSServer (Typology of the Czech countryside by settlement)

The responsible organisation is Evernia s.p.o. (Research Center of Applied Ecology). This service was also found in the Monitoring report under the theme “Land Use”

- III.17 Bio-geographical regions

No datasets found in the INSPIRE geoportal. Only a view service could be detected in the INSPIRE geoportal and the national portal: “Fytogeografické členění ČR” (http://geoportal.gov.cz/ArcGIS/services/CENIA/cenia_fytogeo/MapServer/WMSServer?SERVICE=WMS&REQUEST=GetCapabilities).

Through the map server application of the “Agency for Nature Conservation and Landscape Czech Republic” <http://mapy.nature.cz/>, data on bio-geographical regions could be discovered:

- Biogeografické členění ČR - metadata record: http://metadata.nature.cz/micka_main.php?ak=detailall&uuid=4c2838fe-78c0-4cab-8abb-73270a02080a
- Regionálně fytogeografické členění ČR - metadata record: http://metadata.nature.cz/micka_main.php?ak=detailall&uuid=5AA44920-1F8D-4F7F-90BB-052177D547A7

- III.19 Energy resources

15 datasets could be found in the INSPIRE geoportal that were linked to this theme of which 8 were also linked to the themes Mineral resources and Geology.

The discrepancy between the datasets in the INSPIRE geoportal and the Monitoring report can be explained by the fact that the metadata for this theme were recently uploaded in the INSPIRE geoportal i.e. after the Monitoring Report was delivered.

DE - Germany

Most of the data themes are reported by all federal states. Missing themes:

1. I.1 Coordinate Reference Systems and I.2 Geographical Grid Systems
No datasets reported – difficult to put them as data set.
2. II.4 Geology: reported by all federal states except Schleswig Holstein, German while the national geoportal seems to provide numerous such datasets
3. Some Annex 3 themes are reported by some but not all federal states, which suggests gaps in the reporting, the reason for it not known, for example:
 - III.1 Statistical Units: not reported by Brandenburg, Baden Württemberg, Bayern, Hessen, Schleswig Holstein, Saarland, Sachsen Anhalt, Thüringen
 - III.3 Soils: reported by all federal states except Schleswig Holstein

DK - Denmark

In the monitoring report 23 datasets (20 unique datasets, some are reported more than once for different spatial data themes) of Annex I are reported. For Annex II and Annex III no datasets were reported in the monitoring sheets. In the INSPIRE geoportal 295 datasets can be found, 62 are classified in Annex I Spatial Data Themes.

- I.9 Protected sites

Only 5 datasets were reported in the monitoring report and 28 datasets are classified under this spatial data theme in the INSPIRE geoportal. Example INSPIRE geoportal:

Beskyttede vandløb (Kontakt egen kommune)/ EN: Protected streams (Metadata data: 2012-01-21T20:33:21)

No datasets were reported in Annex II, 34 datasets are classified as Spatial Data themes that are related to Annex II. Each theme in Annex II is represented in the INSPIRE geoportal.

- II.2 Land cover

15 datasets are classified in the land cover theme in the INSPIRE geoportal. Most of the datasets (if not all) are related to different versions (1:200 000, 1:25 000, b&w ...) of the topographic map. Example:

DTK/4cm-kort (1977-1992) (Cadastre, Ministry of Environment) (metadata data: 2012-12-05T15:40:20)

DTK/kort200 (Cadastre, Ministry of Environment) (metadata date: 2012-12-05T15:42:29)

- II.4 Geology

11 datasets are classified in the geology theme in the INSPIRE geoportal.

Shallow geofysik, Marta (GEUS, DE NATIONALE GEOLOGISKE UNDERSØGELSER FOR DANMARK OG GRØNLAND)

Eight of the 21 themes in Annex III are not represented in the monitoring nor in the INSPIRE geoportal. The other themes (for example: land use) are also not in the monitoring report, but are present in the INSPIRE geoportal (if only with a few datasets).

- III.4. Land Use

48 datasets are classified in the land use theme in the INSPIRE geoportal.

Examples:

Skovrejsningsområder (Naturstyrelsen, Miljøministeriet) (metadata date: 2013-12-06T05:30:50) (EN: afforestation area)

Råstofområder (Kontakt egen region) (metadata data: 2013-05-17T14:52:23) (EN: Mining area)

Braklagte arealer (Ministeriet for Fødevarer, Landbrug og Fiskeri) (Metadata date: 2012-01-19T13:11:32) (EN: Set-aside land)

For some datasets the metadata date can indicate, the data were not yet available at the time of the monitoring report in May 2013. For others that can't be an issue.

- III.9. Agricultural and aquaculture facilities

There are no datasets of this theme present in the INSPIRE geoportal. Datasets can be found in the national geoportal (<http://www.geodata-info.dk/>). Example:

Særlig værdifulde landbrugsområder (datasæt) (Naturstyrelsen, Miljøministeriet) (EN: Particularly valuable agricultural areas)

- III.16. Sea Regions

One dataset can be found in the INSPIRE geoportal.

MaritimeBoundaries (Kort & Matrikelstyrelsen, Miljøministeriet)

General

All the datasets in the monitoring report are from the Geodatastyrelsen (Geodata Agency). Most of the datasets that are not in the report but can be found in the INSPIRE geoportal, are property of other agencies like Miljøministeriet, Ministeriet for Fødevarer, Landbrug og Fiskeri ...

EE - Estonia

In the monitoring report 35 data sets are reported, 29 datasets can be found in the INSPIRE geoportal. All annexes are represented. Only in Annex III, 8 themes are missing in the monitoring report but only 6 themes can be found in the INSPIRE geoportal. All themes in the INSPIRE geoportal related to Annex III can be found in the monitoring sheet, except III.1 Statistical units.

- III.1 Statistical units

In the monitoring report this theme was unrepresented. In the INSPIRE geoportal one dataset can be found: (dataset) Statistiline ruutvõrk (Statistikaamet) (metadata date: 2013-06-18) (EN: statistical units)

The metadata date could indicate that this dataset was not available during the making of the monitoring report in May 2013.

- III.10 Population Distribution en demography

There is one dataset in the monitoring report:

Rahvastiku ruutkaart (Statistikaamet) (Metadata date: 2013-06-18) (EN: Population grid data (Statistics Estonia)). This dataset is not represented in the INSPIRE geoportal but can be found in the national geoportal (<http://inspire.maaamet.ee/>).

At least one extra dataset with the same theme can be found in the national geoportal:

Rahvastik haldus- ja asustusüksustes (Statistikaamet) (metatadata date: 2013-06-27) (EN: Population management and settlement units)

The date of both datasets would suggest that the datasets could not be reported in May 2013. However, the first dataset is in the report, but not in the INSPIRE geoportal. There seems to be no clear reason why the data are not in the report or the INSPIRE geoportal.

General

Few data are reported, mostly just one per theme, this is the same in the INSPIRE geoportal. Some data might be wrongly classified as belonging to a certain theme in the INSPIRE geoportal. For example:

(dataset) Corine maakate (Keskkonnateabe Keskus) (EN: CORINE landcover)

(dataset) Mõõtealade andmekogum (Veeteede Amet, Veeteede amet, Veeteede amet) (EN: data measurement area (Maritime Administration, Maritime Administration, Maritime Administration))

are classified in the theme addresses.

ES - Spain:

- I.1 “Coordinate Reference Systems” and I.2 “Geographic Grid Systems”
No datasets are present for “Coordinate Reference Systems” and “Geographic Grid Systems” themes in the M&R. No dataset are present in the metadata catalogue of the Spatial Data Infrastructure of Spain either. Conversely, in the INSPIRE geoportal we have 25 datasets for Coordinate Reference Systems and 14 datasets for Geographic Grid Systems. Therefore we did not go further with our analysis for those themes. It is not clear why they are not reported.
- III.15 Oceanographic geographical features
Only two datasets are present in the M&R sheet but no datasets are present in the INSPIRE geoportal. In the M&R sheet datasets are sometimes (potentially) misclassified under another "similar" data theme. For example, the definition of Oceanographic Geographical Feature "Physical conditions of oceans (currents, salinity, wave heights, etc...)".

Datasets such 'Salinidad media de las masas de aguas marinas y oceánicas' or 'Vegetación Submarina' or "Calidad de Aguas" or "Corrientes" which are present in the report (see "dataset list" sheet in the attached excel file) are classified under the "Sea region" theme while they should probably be classified under the Oceanographic geographical features theme.

The official metadata catalogue of the Spatial Data Infrastructure of Spain was searched for themes with no or few occurrences in the M&R. For example: according to the M&R, 2 Cadastral parcel data sets are available, while the INSPIRE portal has 47517 entries. This is however mainly due to the organisation of the data sets.

FR – France:

Almost all themes were covered in the Monitoring Report. For Spatial Data theme III.10 Population distribution — demography no datasets are reported in the monitoring report. For some Spatial Data themes there are more datasets available in the INSPIRE portal than there are datasets (for that theme) in the monitoring report. A few examples are given.

- I.5 Addresses

Only 9 datasets are reported in the INSPIRE M&R. But 23 datasets can be found in de the INSPIRE geoportal. For most of those datasets, no metadata date is available so it could mean that the data were not yet available at the time of the monitoring.

Examples: "Commune de Bordeaux : Référentiel adresses" by Commune de Bordeaux. No metadata date filled in.

- III.3 Soils

Only 4 datasets are reported in de monitoring. But 25 datasets can be found in de the INSPIRE geoportal. For most of those datasets, no metadata date is available so it could mean that the data were not yet available at the time of the monitoring. This is for example the case for the following datasets:

"Atlas des cavités souterraines Carte des indices" by DDT_49 with metadata data2014 03 29. The dataset was classified under more than one theme, but in this case is not reported in the monitoring

"LANGUEDOC-ROUSSILLON - Indice de Qualité des Sols en Languedoc Roussillon (14 classes, IQS) " by DRAAF LANGUEDOC-ROUSSILLON with metadata data 2014 01 06. This dataset was only classified under the theme Soils.

There are also datasets who are available in the national geoportal (<http://www.geocatalogue.fr/SearchTileForward.do>) which are not reported in the monitoring and are not available in the INSPIRE geoportal. Example:

Données sur la modélisation de l'aléa érosif en Languedoc-Roussillon by INRA (property)/ SIG L-R (contact). Metadata date: 2010 06 01.

They indicate in the portal that the data are not complying with international trade standards. This can mean that this regional dataset is not made available because it is not conform INSPIRE rules.

- III.9 Agricultural en aquaculture facilities

Only 13 datasets are reported in de monitoring. But 23 datasets can be found in de the INSPIRE geoportal. For some of the datasets, no metadata date is available. Example:

« Établissement hébergeant des bovins en Sarthe » by ddpp72. No metadata date is mentioned.

- III.10 Population distribution — demography

No datasets are reported in the monitoring, 7 datasets can be found in the INSPIRE Geoportal (15 stated in the INSPIRE Recourses Summary Report). None of them has metadata date filled in.

Although most of them are not classified under more than one Spatial Data theme, the subject of the datasets does not always really match the Spatial Data theme. Examples:

(dataset) Unités urbaines 2010 - Limousin (INSEE), (dataset) Bassins de vie en Poitou-Charentes (DREAL Poitou-Charentes), (dataset) Aide à finalité régionale en Poitou-Charentes (surface) (SGAR PC), (dataset) Pays du Grand Bergeracois : Cartes du logement (Association du Pays du Grand Bergeracois), (dataset) Arrondissements en Poitou-Charentes (surface) (DREAL Poitou-Charentes), (dataset) Installations classées faisant l'objet d'un porter à connaissance (PAC) en Poitou-Charentes (point) (DREAL Poitou-Charentes), (dataset) Installations classées (SEVESO et autorisées) en Poitou-Charentes (point) (DREAL Poitou-Charentes)

General observation on FR:

The evolution of the INSPIRE geoportal in time should be taken into account: more and more datasets are made available. Specific for France is the large amount of (often regional) data custodians and the efforts to streamline can be another reason why datasets are not reported in the monitoring or not available in the INSPIRE geoportal.

GR – Greece

Greece covers all the themes well except III.17 Bio-Geographical Regions and III.19 Species Distribution. However we could not find evidence of spatial data sets falling under these two themes in national or thematic portals.

HU – Hungary

In the monitoring report 88 data sets are reported. Since there is no discovery service for HU registered at the INSPIRE geoportal, so no datasets from the report can be found in the geoportal.

In the report all annexes are represented, but not all themes. In Annex I, theme I.2 Geographical Grid System and theme I.5 Addresses are missing. In Annex II all

themes are represented. In Annex III, 6 of the 21 themes are missing: III.5 Human health and safety, III.6 Utility and governmental services, III.15 Oceanographic geographical features, III.16 Sea regions, III.17 Bio-geographical regions, III.18 Habitats and biotopes; themes III.15 en III.16 probably do not apply to Hungary since the country has no coastline. Because there is no national geoportal and the Hungarian language forms a barrier, it is very difficult to find the datasets.

For some themes in Annex III (III.1, Statistical units, III.9 Agricultural and aquaculture facilities, III.10 Population distribution), we can find the following information on the website (http://www.ksh.hu/inspire_eng) of de Hungarian Central Statistical Office (HCSO – KSH).

HCSO plans to disseminate the data below within the following spatial data themes in the course of 2014:

- 1. Statistical units: 1-kilometre and 5-kilometre grids*
- 2. Population distribution — demography: population and dwelling numbers from population census held in 2011*
- 3. Agricultural and aquaculture facilities: number of agricultural holdings and agricultural labour force data from agricultural census held in 2010*

Some datasets can be retrieved from the FÖMI map database (Földmérési és távérzékelési Intézet - Institute of Geodesy, Cartography and Remote Sensing).

<http://www.geoshop.hu/index.php?module=StaticPage&pageid=21>

On the website the metadata are available and you can buy the data (login required). There are only 10 datasets available in the FÖMI map database, most of them are mentioned in the monitoring report. There are some datasets available which could relate to the Land Use theme (III.4) but are not mentioned in the monitoring report.

Topographical Maps (FÖMI) (metadata date: 2002-06-18): Raster data, Vector data, Contour lines

Another organisation with thematic data from this Annex is the Department-General of Nature Conservation, VM under the Ministry of Rural Development (<http://www.termeszetvedelem.hu/tir>). They have Nature Conservation Information System available: (http://geo.kvvm.hu/tir_en/viewer.htm). There are some datasets in a map viewer which are not all mentioned in the monitoring report. For example:

- Eco-tourisme: public cave, demonstration site, study trail
- Biotics data : Isophya costata, Cramble tataria, ...

IE - Ireland

Missing themes:

- III.2 Buildings, III.5 Human Health and Safety:
Some of these stakeholders are currently slowly populating the national catalogue <http://catalog.isde.ie>, so that when the work is done these will be transferred to the EU geoportal.

- III.15 Oceanographic Geography, III.17 Bio-geographical Regions and III.18 Habitats & Biotopes:

A large piece of work is about to be undertaken by an external contractor which will poll the Irish Spatial Data Exchange (ISDE) for entries for the INSPIRE geoportal. Once this is done, probably in April 2014, a few more datasets under these themes will become available. These will particularly include maritime and oceanographic datasets as it's the Marine Institute who is managing the process.

LV – Latvia

The INSPIRE M&R has several themes not covered at all, such as III.3 Soils, III.10 Population Distribution (only referring to statistical database), III.14 Meteorological Geographical Features and III.17 Bio-geographical Regions. Although for the latter theme a data set is coded in the INSPIRE portal, this is probably not correct since it refers to one of the topographic map products which contains no information regarding theme III.17. Also many themes are covered by the same data sets corresponding to the topographic maps at different scales and not referring to specific data sets. It seems that not all the relevant stakeholders are involved in the M&R exercise. This is certainly the case for the meteo community which seems to have information on weather stations (own website).

LU - Luxembourg

In the monitoring report 204 datasets (Annex I: 100, Annex II: 30 and Annex 3: 74) are reported. Only 29 datasets (20 layers, 24 services) can be found in the INSPIRE geoportal. However, no data are reported for almost half of the themes in Annex III (12 of 21 themes is missing). For some of the themes examples are shown below.

- III.9 Agricultural and aquaculture facilities

No datasets are reported, no datasets can be found in the INSPIRE geoportal. At least one dataset is available in the national geoportal (<http://geoportail.lu/Portail/>). Example national geoportal :

Parcelles FLIK 2014 (Les parcelles de références agricole luxembourgeoise 2014) Creation date in metadata : 12/02/2014

- III.13 Meteorological geographical features

No datasets are reported. In the INSPIRE geoportal 8 datasets can be found (7 of them are also classified under III.14: Atmospheric conditions). At least one dataset is available in the national geoportal. Example INSPIRE geoportal:

Hourly observations, average air temperature, rainfall, air humidity, Wind speed, wind direction, global radiation, air pressure, soil temperature, leaf humidity, snow depth. (agrimeteo, Administration des Services Techniques de l'Agriculture ASTA BP 1904 L- 1019 Luxembourg) Metadata date : 2013-12-17

Monthly amount of precipitation observations (MeteoLux - Climatology) Metadata date: 2013-12-05

The date of the metadata indicates the data are added to the INSPIRE geoportal after the monitoring report of May 2013. This is the case for all 8 datasets.

Example National geoportal:

Stations météorologiques ASTA (Administration des Services techniques de l'Agriculture)

In the metadata both Spatial Data themes are marked: III.13: Meteorological geographical features, III.14: Atmospheric Condition. Creation date in metadata: 01/01/2011

General

Many Spatial Data Themes are missing in the monitoring report and few of the datasets out of the report are present in the INSPIRE geoportal. More datasets can be found in the national geoportal, and more of them are stated as INSPIRE datasets without finding them back in the INSPIRE geoportal.

NL – The Netherlands

Also the Netherlands does not include all the spatial data sets and services relevant for INSPIRE in their Monitoring list. The reason for the Netherlands is that the focus for INSPIRE data and services are on authentic registers agreed upon by all INSPIRE stakeholders. A good example is theme II.2 Land Cover. While one data set is reported, i.e. TOP10NL, CORINE Land Cover which is an existing product often used in the context of environmental monitoring activities is not. Moreover, NL does not cover two themes:

- III.3 Soils

Digital spatial soil data exist in The Netherlands. This can be read from the INSPIRE geoportal in which 7 data sets related to soil contain more than 2300 layers, but not one of the data sets is reported in the INSPIRE M&R.

- III.9 Agricultural and Aquaculture Facilities

Three data sets can be found in the European INSPIRE portal. The metadata date from end of 2013, so that explains why this was probably not yet reported in 2013.

PL – Poland

In the monitoring report 63 datasets are reported, many more data resources can be found in the INSPIRE geoportal. All annexes are represented in the report. In Annex I only Spatial Data Themes I.1 and I.2 are missing and in Annex II there are no datasets in theme II.4 Land Use. In Annex III, 3 themes are missing: III.16: Sea regions, III.17 Bio-geographical regions, III.18 Habitats and biotopes. In the INSPIRE geoportal not all themes (only 11) out of the report are present.

- II.4 Land Use

The INSPIRE geoportal shows 2163 datasets in this theme although none of them is reported in the monitoring report. Example:

(dataset) miejscowy plan zagospodarowania przestrzennego terenów zainwestowanych wsi Krasków (Urząd Miejski w Kluczborku) (metadata date: 2013-11-23) (EN: (Dataset) zoning plan invested rural areas Krasków (City Hall Kluczbork))

(dataset) Rypin - MPZP 008: Miejscowy plan zagospodarowania przestrzennego Gminy Rypin obejmujący fragment wsi Dylewo, działkę o nr

ewidencyjnym 131/1, przeznaczoną pod funkcję produkcyjno- usługową (metadata date: 2014-02-05)

(EN: Rypin - Unitary Development Plan 008: local development plan covering the Commune Rypin fragment village Dylewo, plot of land registration No 131/1, designed the function of production and service. (Office of the Municipal Rypin)

A lot of the datasets seem linked: the same content, but about another parcel or another region or city. The metadata date can suggest, that the datasets are added to the INSPIRE geoportal after the monitoring report was submitted.

Annex III.

On the website of the national geoportal (<http://geoportal.gov.pl/>) several geoportals can be found. But they all hold a very limited amount of datasets. There is a link on the website "Records of collections and services" (PL: Ewidencja zbiorów i usług: <http://geoportal.gov.pl/ewidencja-zbiorow-i-uslug>) which leads to a list of "records sets and spatial data services". In that list, datasets can be found about several themes (INSPIRE themes are given), also about the themes missing in the monitoring report. Because we can't see the metadata or view the datasets, we can't be certain that the data exist or if they are useable. A few examples:

- III.16 Sea regions

Obszary dna morskiego - rodzaj osadów (Polish Geological Institute-National Research Institute on behalf of the Minister of Transport, Construction and Maritime Economy) (EN: Areas of the seabed - the type of sediment) (date: 07-11-2013)

- III.17 and III.18: Opracowanie ekofizjograficzne (date: 13-07-2012) (EN: Developing (eco physio graphic), this might be ecological regions)

General

Because the national geoportal holds very few data, it is difficult to find the datasets elsewhere. The list of datasets gives not enough information about were to download or view the data.

PT - Portugal:

Missing themes:

- III.14 Meteorological geographical features

In the M&R excel datasets sometimes seem to be misclassified under another "similar" data theme i.e. "Atmospheric Conditions". For example: "Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction". Datasets such "Número de Dias com Precipitação", "Anomalias da Média da Temperatura Máxima Anual" present in the M&R under the theme "Atmospheric Conditions" should probably be classified under the Meteorological geographical features theme.

- III.17 Bio-geographical regions and III.18 Habitats and biotopes

The expert searched for datasets belonging to the above mentioned types not reported in the M&R nor in the INSPIRE geoportal but could not find any. It's remarkable since that data provider for the datasets in the M&R is also responsible for the EIONET reporting.

- The official metadata catalogue of the Spatial Data Infrastructure of Portugal was searched for themes with no or few occurrences in the M&R. But the CNIG catalogue did not reveal more data sets than reported.

RO – Romania

Most themes are well covered in the INSPIRE M&R. Some missing themes:

- I.5 Addresses
There is an ongoing project by the National Agency for Cadastre and Land Registration (ANCP), the Association of Communes of Romania (ACoR) and National Association of Public Administration Information Systems (ANIAP) partnered to launch the National Electronic Register of Streets Nomenclature (RENNS) for Romania. The RENNS project aims to create a unique national register of streets nomenclature. There exists a multitude of address data that needs harmonization, once finished this will be a reference data resource for addresses for Romania.
- III.15 Oceanographic Geography and III.16 Sea Regions
There are no data sets for oceanographic geography. However, there are 7 spatial data sets for sea regions in the INSPIRE portal, while none of them is reported in the INSPIRE M&R. The data contains information about the portions of the Black Sea that are part of RO, marine protection structures such as dams and break waves, rock formations that could be hazardous for ships, etc.

SE – Sweden

- III.3 Soils
No data sets were reported under this theme, while a data set could be found from the Swedish Geological Research Institute (Sveriges geologiska undersökning): Geofysiska markmätningar, tyngdkraft. This data set can be found in the national geoportal, not in the European one, nor in the INSPIRE M&R.
- III.14 Meteorological geographical features
No data sets were reported under this theme, while a data set could be found from SMHI (klimatolog@smhi.se): Meteorologisk analysmodell (MESAN). This data set could be found in the national and INSPIRE geoportal, and was successfully tested (compliant metadata). It is not clear at the time of writing why these are not reported.

SI – Slovenia

Although Slovenia covers all the themes in the INSPIRE M&R except Energy Resources, some themes are just mentioning generic names for the theme, rather than particular data sets. In the national geo-portal many data resources can be found that are not monitored: e.g. aerodrome locations and runways, bicycle

networks (I.5), location of analytical and alarm systems stations (III.7 or III.9). They are probably not considered INSPIRE data sets. Theme not covered:

- III.20 Energy Resources
Although no data set is mentioned in the INSPIRE M&R, several data sets pertaining energy resources could be found in the data catalogue of the Ministry of Infrastructure and Spatial Planning (http://prostor.gov.si/cepp_ang/index.jsp), among others: electric power lines, petroleum pipelines, gas main network and energy yielding metallic and non-metallic minerals.

SK – Slovakia

In the monitoring report 195 datasets are reported, 177 datasets can be found in the INSPIRE geoportal. All annexes are represented. In Annex I, the first two themes are missing. In Annex II there is no orthoimagery present (II.3). In Annex III, 9 of the 21 themes are missing.

- II.3 Orthoimagery

This theme is missing in the monitoring report, but is present in the INSPIRE geoportal with 8 datasets. For example:

(dataset) Ortofotomapy (NLC) (metadata date: 2013-12-17)

(dataset) Ortofotomapy SR (EUROSENSE s.r.o., GEODIS SLOVAKIA s.r.o.) (metadata date: 2010-12-09)

The metadata date can't explain the absence of the datasets in the monitoring report.

Annex III - In the monitoring report, 9 Spatial Data themes are missing: III.5 Human health and safety; III. 9 Agricultural and aquaculture facilities; III.10 Population distribution-demography; III.12 Natural risk zones; III.14 Metrological geographical features; III.15 Oceanographic geographical features (not applicable to SK); III.16 Sea regions (not applicable to SK); III.20 Energy resources and III.21 Mineral resources.

From those themes only III.5 can be found in the INSPIRE geoportal.

- III.5 Human health and safety

Two datasets can be found in the INSPIRE geoportal.

(dataset) Enviromentálne a zdravotné indikátory SR (Štátny geologický ústav Dionýza Štúra) (metadata date: 2011-12-08) (EN: Environmental and health indicators SR (State Geological Institute Dionyz Stur))

(dataset) Enviromentálne a zdravotné indikátory Banskštiavnickej oblasti (Štátny geologický ústav Dionýza Štúra) (metadata date: 2011-12-08) (EN: (Dataset) Environmental and health indicators Banskštiavnické area (State Geological Institute Dionyz Stur))

- III.20 Energy resources

For this theme no datasets are reported in the monitoring report. One example

Atlas geotermálnej energie (Atlas of Geothermal energy) (publication date: 2010 04 22)

This dataset is not reported in the monitoring, but is available in the national geoportal and the INSPIRE geoportal. In the INSPIRE geoportal there is no theme defined for the dataset. The dataset could also be classified under geology, but there is no clear reason why it should not be in the monitoring report.

UK

Missing themes:

- I.1 Coordinate Reference Systems and I.2 Geographical Grid Systems:
Peter Parslow at Ordnance Survey expressed confusion about how exactly these themes can be provided as datasets. Other member states appear to use this theme, especially grid systems for datasets which also belong in other themes, but do so inconsistently.
- III.15 Oceanographic Geography:
The UK Hydrographic Office (Mark Haliwell) is currently undertaking out some work that will result in around 1400 historic datasets being added to the national geoportal and then populated to INSPIRE from there. However many of these (for the Maritime & Hydrographic Office) are already in INSPIRE under 'II.1 Elevation'. Putting them also under theme III.15 would require additional metadata implementing work when providing these data through WFS.
- III.16 Sea Regions:
Some data will be delivered under this theme as part of the large UKHO import mentioned above.

4. CONCLUSIONS

The objectives of the INSPIRE evaluation through direct observations were: 1) to compare, analyze and better understand the differences between the results of the reported spatial data sets and services (INSPIRE M&R of May 2013) and those that can be found in the EU geo-portal; 2) to test the metadata records for spatial data sets and services, and to check their compliance with the INSPIRE Implementing Rules and Guidelines and 3) to better understand why certain spatial data sets and services relevant for INSPIRE can't be found in the Monitoring & Reporting sheets, while they can be found in the European and/or national portals.

All the Member States were analyzed, and while for 6 countries the testing itself could only partially take place (because no resources could be found in the INSPIRE geoportal), an extensive sample of 752 spatial data sets was validated, while 352 view and download services were tested as well. The selection was based on a sampling method with the objective to cover 10% of the reported spatial data sets and services, with a minimum of 10 and a maximum of 50 for each country. The selection was done taking into account the different data providers contributing to the infrastructure. For the selection of the spatial data sets also the distribution over the annexes and themes was taken into account. Some major conclusions can be drawn from this evaluation exercise:

1. The number of spatial data sets and services described in the M&R (18.138 and 7.088 respectively) and in the European INSPIRE geoportal is impressive (226.848 and 22.939 respectively). There is an important difference between the two figures for almost all countries (in one or another way). Most of these differences can be 'explained', e.g. the fact that Poland has organized the spatial data sets per sheet.
2. Six Member States have not defined a catalogue or catalogue service in the European geoportal. The reasons for this vary: some countries have not yet set-up a catalogues and catalogue service (e.g. CY), while other countries have simply not provided the catalogue service URL to the European Commission (e.g. IT). In the first case, usually projects are under way to resolve the problem, in the latter case the final step should be easy to take.
3. For those catalogue services that are operational within the European INSPIRE portal, it is not always clear if they harvest all the relevant catalogues in the country which might mean that some spatial data and service resources are not yet included. From the 63 tested discovery service (those defined as an endpoint in the portal and those described in the portal), only 21% pass the test. Fortunately this does not mean they do not function, usually one or more schema validation and metadata element issues should be resolved.

4. From the 752 tested spatial data sets, 57% can be found back in the INSPIRE portal. The metadata need improvement: 23% pass the tests. While there are some schema validation issues, most errors relate to missing or incomplete metadata elements. In most cases the element related to the statement of conformity of the spatial data set is missing or incomplete (this information is usually not yet added). If we would not take this element into account, the number of resources that would pass the test would be higher than 70% (estimate). Other elements that are often missing relate to the “conditions of use” and “the limitations on public access”.
5. From the 352 tested services, 249 are viewing services and 103 download services. Almost 41% could be found back in the European geoportal of which 62.5% were accessible at the time of testing. Part of those that were not, can be explained by the existence of access mechanisms or firewalls. This is the case in 6 countries (AT, CZ, ES, FI, LV and SE). In some countries, it concerns download services as well as viewing services. 25% of the services have compliant metadata, but only 5% of the services are compliant themselves.
6. Finally, many resources can't be found in the INSPIRE portal, but can be found in national portals. This is the case for around 12% of the spatial data sets and services. Moreover, some spatial data sets that can be found in the INSPIRE geoportal are not described in the INSPIRE M&R sheets. A precise number can't be given but many examples are given in section 3.2.4.3. In particular several themes of annex III are not yet covered in the INSPIRE M&R, despite the fact that there are clearly spatial data sets available for some of these themes. This is partially due to Member States' policies to limit the number of spatial data sets they consider INSPIRE data sets, partially this is due to ongoing efforts of Member States that try to involve gradually thematic communities in the INSPIRE implementation efforts. Many new data sets have been added between May 2013 and spring 2014. This means that there is a positive development which should be reflected in the INSPIRE M&R of May 2014.

Some more general conclusions could also be drawn with regard to the INSPIRE M&R process as such. One important conclusion/recommendation would be to improve the guidelines for monitoring and reporting. Member States should start from the existing national catalogue and derive a first list of spatial data sets and services from there (as several countries are already doing). This would avoid that there are too many differences between the INSPIRE M&R and reality (the catalogues). It is also clear from the analysis that in many Member States the M&R is done by people not necessary aware of what is available, or that different organisations are asked to add data sets and services to the list(s) based on their own insight. Overall, the revised guidelines would certainly help countries to improve the INSPIRE M&R process, which in the end would facilitate monitoring of ongoing efforts in their country as well.

5. ANNEXES

5.1 Template for data gathering

5.2 Results of the tests per country